VXA

Nautical

"*The Seas but Join the Nations they Divide.*"

THE

NAUTICAL MAGAZINE

FOR 1880.

NEW SERIES.

A JOURNAL OF PAPERS

ON SUBJECTS CONNECTED WITH

MARITIME AFFAIRS.

VOLUME XLIX.

London:
SIMPKIN, MARSHALL, & CO., STATIONERS' HALL COURT;
J. D. POTTER, 31, POULTRY;
KENT & CO., PATERNOSTER ROW;
AND THE PRINCIPAL NAUTICAL PUBLISHERS AT ALL SEAPORTS.

LONDON:
PRINTED BY PEWTRESS & Co.,
Steam Printing Works,
15, GREAT QUEEN STREET, LINCOLN'S INN FIELDS, W.C.

THE

NAUTICAL MAGAZINE

FORTY-NINTH YEAR.

VOLUME XLIX.—No. I.

JANUARY, 1880.

THE SHIPPING TRADE AND INDUSTRY.

A Roundabout Paper for 1880.

THE attention of all classes has been attracted to the depression of trade, a depression which affected not one alone but all branches of commerce, those dependent upon one another having more especially suffered. The bad grain and hop harvests probably represented an absolute loss of thirty millions of pounds sterling. The cause of the late depression could be traced and satisfactorily explained by a Senate or Council composed of representatives of persons and bodies engaged in the separate branches of commerce involved. Failing the report of such a representative body, explanations far from satisfactory or comprehensive have been given; and at the present time, on the broad question of the general depression, little beyond the fact that it has been universal can be said. It would be a great help, therefore, at the present time, when everybody is hoping "things are better," if leading men would dispassionately, through the press, give their opinion as to the causes of the depression in their own business, whatever it may be. The manufacturers of iron and steel, and the brokers in the metal, the colonial, and the corn trades, for instance, could give their views of the causes of the late stagnation and dulness in their businesses,

Nautical

"*The Seas but Join the Nations they Divide.*"

THE

NAUTICAL MAGAZINE

FOR 1880.

NEW SERIES.

A JOURNAL OF PAPERS

ON SUBJECTS CONNECTED WITH

MARITIME AFFAIRS.

VOLUME XLIX.

London:
SIMPKIN, MARSHALL, & CO., STATIONERS' HALL COURT;
J. D. POTTER, 31, POULTRY;
KENT & CO., PATERNOSTER ROW;
AND THE PRINCIPAL NAUTICAL PUBLISHERS AT ALL SEAPORTS.

LONDON:
PRINTED BY PEWTRESS & Co.,
Steam Printing Works,
15, GREAT QUEEN STREET, LINCOLN'S INN FIELDS, W.C.

THE
NAUTICAL MAGAZINE

FORTY-NINTH YEAR.

VOLUME XLIX.—No. I.

JANUARY, 1880.

THE SHIPPING TRADE AND INDUSTRY.

A Roundabout Paper for 1880.

THE attention of all classes has been attracted to the depression of trade, a depression which affected not one alone but all branches of commerce, those dependent upon one another having more especially suffered. The bad grain and hop harvests probably represented an absolute loss of thirty millions of pounds sterling. The cause of the late depression could be traced and satisfactorily explained by a Senate or Council composed of representatives of persons and bodies engaged in the separate branches of commerce involved. Failing the report of such a representative body, explanations far from satisfactory or comprehensive have been given; and at the present time, on the broad question of the general depression, little beyond the fact that it has been universal can be said. It would be a great help, therefore, at the present time, when everybody is hoping "things are better," if leading men would dispassionately, through the press, give their opinion as to the causes of the depression in their own business, whatever it may be. The manufacturers of iron and steel, and the brokers in the metal, the colonial, and the corn trades, for instance, could give their views of the causes of the late stagnation and dulness in their businesses,

and of the improvement therein. The details, perhaps, would be long, and the questions to be considered intricate and many: they would involve consideration of the competition of foreign markets and the expense necessary for machinery required to substitute steel for iron; the narrow margin of profit to merchants or speculators, and the restricted advances of bankers, and many other points which indirectly influence such businesses. The owners of collieries, again, could give their views, excluding perhaps, the vexed questions which arise from strikes. No legislation can help us, except, perhaps, in one or two branches, for the country is happily not prepared to return to protection. Again, the public generally have lost too much money to desire the spirit of wild speculation to reappear, and bankers have learnt a lesson from Scotland and the West of England that will make them exercise a caution as to the use of their clients' money. From the high prices of coal a few years ago, it is possible that too many new collieries were opened, and a demand arose for coal in all parts of the world even at the then high prices, which prompted the opening of collieries in Japan, India, Australia, America, and Germany. Having once been set going they are now able to supply their own wants as well as those of their neighbours, thereby limiting the demand for English coal. English coal mixed with foreign, however, improves the quality of the latter and admits of it being burnt with greater economy, and this must always ensure a certain demand for English coal. We should also learn how far the advance in science made by engineers has reduced the consumption of fuel required by steamers and the consequent effect, on the demand for coal. In the hope of inducing others to follow our example, as regards the dissemination of useful deductions concerning their own particular businesses, we venture to put forward some remarks on the depression in our own, basing our views upon an acquaintance of nearly thirty years of the shipping trade, in its different branches and aspects.

The depression in shipping and the unremunerative freights present a large field for inquiry; and for those readers not possessed of a knowledge of shipping property we combine with

our explanation some few general cautionary remarks. They may be of use, as so few of the general public, although many are shareholders in ships, really understand shipping business and the working of ships. They have invested in ships without any consideration of the manner in which shipping management is carried on. By that good "general public" investments of late years have been made both in ships and in steam-boat companies. A member of the outside public taking a share in a ship may, if he is more than ordinarily versed in shipping matters, know some general facts, such as that, before steam was so universally known, the splendid sailing ships of Messrs. R. and H. Green, Messrs. Money Wigram and Sons, and Messrs. T. and W. Smith, now remembrances of the past, chiefly took the Indian passengers and goods. Shipowners' societies have their existence everywhere for protective purposes, and Lloyd's Register of Shipping ensures, by its superintendence of the building of nearly all steamers and ships, sound workmanship and complete equipment, and duly registers those so built. The Board of Trade carries out most efficiently the various Acts of Parliament regulating the complex machinery necessary, and providing restrictions to secure the safe navigation of vessels, and protection as far as practicable to life and property. A ship or steamer is held in 64 shares, and any person, being a British subject, may hold one or more, but the number of registered owners must not exceed 32. Any owner may split up one share into smaller shares, but no fraction of a share can be registered. The managing owner is supposed to have the largest interest, and to be chosen by all the co-owners, as he is responsible, *prima facie*, for the debts of the vessel. Members of the outside public thus investing cannot however be expected to know that though in theory every bill of sale should appear at the Custom House on the register of the vessel, great abuse exists as to registration, which misleads persons having to deal with ships, and is unjustifiable under any circumstances. The only official record of title is the entry in the register books, but private and unregistered bills of sale are given even for half shares, and managing owners often appear on the official books to hold more shares than they actually have, thereby deceiving persons at home and abroad who,

relying upon the correctness of the register, which is their only source of information, give credit to the vessel and her registered owners. Private bills of sale are doubtful securities to the holder until registered, but they can be registered at any time, therefore if a managing owner gets into trouble, his co-owners may find that his entire number of shares has been sold to and registered by persons quite unable to pay the debts of the ship, when those of the remaining registered owners who can pay are obliged to defray the ship's debts. In a case which lately happened, an owner of two shares had to pay not only his own share of debts, but those of his co-owners. Mortgages again are often given and not registered, although non-registration imperils the security, as in the case of bills of sale; and there is nothing to prevent money being advanced on shares, if the register makes the ship appear as if owned by a person and wholly unencumbered though he may have given private bills of sale unregistered previously. If the holder of a bill of sale gets it registered first, he defeats the mortgagee's security, and *vice versa*. So many cases have come to light of securities being doubly pledged, that the fraud we have suggested is anything but imaginary. On sound commercial principles, no man of business should hold a bill of sale of, or mortgage on, any vessel without having it instantly recorded in the register book at the Custom House, for it is unjust to others as well as dangerous to himself to neglect this. Moreover the liability of holders of private bills of sale is more extensive than many people suppose, and frequently an unregistered owner can be made liable for supplies to the ship. Trustees and executors would do well to bear this in mind. But assuming that holders of private bills of sale can be held liable under certain circumstances for the ship's debt, yet it is for the creditor to establish the liability, which is most unfair; and the only legislative remedy would be to compel the registration of the name of every holder of a bill of sale or mortgage; then the creditor would only have to look to the register to ascertain who is responsible to him. This is the intention of the law now, and all that is needed is that the intention be fulfilled. Turnbull's Register of Shipping for the East Coast gives particulars of the registered holder of each share, and it is a pity such a book

does not exist for London, Liverpool, Glasgow, and other places. For the payment of one shilling at Basinghall Street, similar information can be obtained from the Register there, but to be of practical use, it wants compiling by some intelligent man into a book for each port, with the addition of the registered mortgages, for with the assistance of such books as these the creditor, at any rate in England, could see at a glance whom he is trusting, and thus protect himself from loss. The member of the outside public who invests in ships often cares for none of these things, and suffers accordingly. One great cause of increase in the number of steamers has been the profit which, in some ports more than others, accrues to managing owners in such capacity; brokers and others often "place" the shares of ships, taking a small number themselves to secure the management and consequent profit. Shipowning, as a distinct business, as formerly existing, has been considerably altered, and some ship-brokers combine both characters. It is thought that managing steamers, and holding shares with other shipowners gives a backbone to a ship-broker's business. So it does, and has done, while business was brisk, and 30 and 40 per cent. was made by owners generally on their shares, and some managing owners then (what with brokerages every few months on the chartering, and on the insurances, with the addition of the managing commission), possibly secured 50 to 60 per cent. on their shares. In a depressed time like that which we have just passed through, ordinary owners get a smaller interest on their shares, although a good interest is often secured to the managing owner from his brokerages and commissions, &c., and the misfortune for other owners sometimes is that the managing owner's other interests are not always the same as those of his co-owners. Would a merchant who receives tea from China, produce from India, sugar from the West Indies, or corn from the exporting countries, place his cargoes in the hands of brokers in Mincing and Mark Lanes, if he knew those very brokers had produce of their own to sell, and had their own interests to serve as well as, if not before, those he entrusted to them? Yet an analogous proceeding not infrequently happens in the shipping business. In some ports, those persons who have shares in steamers, and go in purely for ship-owning as a business, charge only (say) £100 a year for counting-

house expenses, and in some cases also credit the steamer with a share of the brokerages they receive, and usually taken by managing owners; and in addition also credit the discounts on the stores, &c., purchased for cash payments. In some other cases the managing owner has been known to take all these for himself. Co-owners in many other cases are now beginning to insist on the first plan being followed, and that where the managing owner is a broker, he should be made to be content with his manager's commission; or with a fixed allowance, which should be recognised by all the co-owners: when this arrangement exists all brokerages are returned, and not given to his firm to back up his business at the expense of his co-owners' profits. Meetings to bring about this kind of management have recently been called in Cumberland, as will be seen by referring to the accounts at length of the meetings reported in the *West Cumberland Guardian* and *Whitehaven Herald* of the 18th, 20th, and 27th September last. The broker is, under such a system, either a broker pure and simple, as he ought to be, or else a shipowner, making the management of ships his business, and being paid a fair remuneration. The outside members of the community who hold shares in ships, are beginning to inquire whether the evil of allowing a managing owner to charge brokerages is not that, being sure of his brokerages, he can afford to consider the interest of the merchants before the interest of his co-owners, and whether he may not be tempted to do so to secure the brokerage business which the merchants can put in his way. It is very difficult for co-owners to dispute or inspect the contracts of their manager. Brokers are, in some cases, in the habit of employing others in various trades who have steamers, so as to get a reciprocation.

Some shipbuilders also, by assisting the increase of tonnage beyond the demand, have helped to bring about a depression. Competition among builders has for some years been very great, Clyde *versus* the Tyne, Wear, Hartlepool, and Stockton, and there are those who think that the East Coast has fairly won the day, though there is no denying the fact that exceptionally well-finished work is the characteristic of the Clyde. Cargo boats,

however, do not require this. East Coast built steamers earn as much money and give the speed quite as well as do the most finished boats of the Clyde. At the outset of the shipowning mania some builders would not enter into the speculative spirit of the day, and for two or three years were content to secure such orders only as really paid them; but on the heavy fall in iron and the cheapening of wages, to hold their own position they had to take orders which little more than paid the outgoings, or else to take orders at better rates but entailing long dates, sometimes three or four years, for the payment of the instalments of the purchase-money. They were, also, very often compelled to take shares in the steamers themselves to get the ship built at all. This system has, however, not bettered the position of shipping at the present time, whatever it may do for the future, and it has increased tonnage on an unsound basis; moreover, speculators, with next to no means, have, in some instances, become shipowners.

The idea of the parties who began this system of becoming owners was no doubt ingenious, but it is not based on sound commercial principles. The calculations to allow of such arrangements were made some years ago, when freights were high, and were based on the long credit for the payment of the purchase-money of the steamer, as against the ready receipt of the freights. The receipt of the freights allowed working disbursements to be paid, and yielded enough to meet the bills for the instalments of purchase-money without calling on the shareholders; and by settling after every voyage, and paying the co-owners a good percentage on their shares, they were in funds to pay when the amount had to be provided. Hence, in a period when freights were high, little or no money was needed to be found. When, however, any depression sets in, and sailing expenses do not diminish, and heavy expenditure is necessary for repairs, the ship turns out a white elephant, and must so continue until sold, perhaps at a heavy sacrifice, or until the necessary outlay is provided for repairs, or until business rights itself, and yields such a profit as will meet all contingencies, or until a sufficient tonnage is "lost" to allow of the supply being brought down to the demand. This last desideratum can hardly happen, if the yearly building is

by unsound and abnormal means fostered into more than keeping pace with losses.

There has been a falling off recently of the more sanguine characters, who have had to look losses in the face and make up calls for repairs, and the idea has lately occurred to others of equalising the cost of their steamers built some time back when prices were high, by purchasing the same class of steamers at the lower prices of the day, apportioning the united cost amongst the whole, thus reducing the cost of each individual steamer; and a rush was in some cases made to carry out the idea before iron again went up in price. Large Companies, and Capitalists (who are quite independent of the class of speculators), knowing individually their co-owners as being men of substance and integrity, can now, by putting down sufficient money for the purpose of ship-owning as a business, build good steamers which will pay even at at the late low freights. Iron never was cheaper than recently, and may again fall after the recent rise. Wages are likely to keep about where they are at the present time, particularly in ship-builders' yards, unless a wild and foolish speculation for building arises. There are vessels afloat now, not suitable for all trades, some bad carriers, others of not a desirable model; the building of new steamers on well-considered plans therefore now gives this advantage, that while the steamer is building, times may go on improving, and by the launching time next year, the best part of the freighting season will be ahead. Steamers built a few years ago at high prices, unless the cost has now been partially written off, and the vessels are in good repair, cannot compete with new ones having the latest improvements, and built and run at a lower cost; as the owners of the former cannot afford to accept the freights which will pay the owners of the latter. This is a serious point for any members of the outside public who own unregistered shares in such ships to bear in mind.

At the present time it is estimated that about 160,000 tons of steamers are being built, of which upwards of 64,000 are on the Clyde. There are, out of this, no doubt, many steamers for existing companies and solid people. At the same time there is doubtless a proportion built on speculation, and though the

public may not openly be asked to subscribe, privately a great deal of the capital is obtained from them, without their knowing what an unsound or dangerous investment speculations in such ships may sometimes be. In 1877, there were 658 vessels classed in Lloyd's Book, showing 521,523 tons register; in 1878, 649 vessels, showing 574,819 tons register, and it may be calculated that at the end of this year between 400,000 and 450,000 register tons will have been built and building in England. Within a very recent period, however, a great rush has taken place in the building of steamers, and further money will have to be found outside the present circle of shipowners, who can have no profits to invest, and may have little inclination, if prudent, to start new ventures. We do not say to the outside public that they ought not to invest at all. What we do say is that they should never invest a penny without ascertaining the nature of the ship and the business, and the method adopted in each case as to the registration of ownership and bills of mortgage and sale in the register book at the Custom House. The public must also bear in mind that if the profits in any venture in private ships is represented to be inordinately large, the marvel is that the persons who are willing to place those advantages in the lap of the outside public should be so much more Quixotic than the usual run of business men.

Good management, with men of substance for owners, with ready money to secure every possible discount, is the only true method to provide against possible losses. Steamers which have their regular trades and are favourites, keep paying their way; so do other steamers which are well known and economically managed. Lately, however, even with good management, little has been paid in profit to provide for a reserve fund necessary for insurances, wear and tear, and depreciation. This may be a reason for the circular which many of the owners in the China and Australian trades have just put forward, a combination of Protectionists, although in politics highly Liberal and Free Traders. Through the abundance of steamers, freights are kept low, and owners who take what is offered with a good grace aid in keeping freights down, and

though there is every ground for hope, it requires some time yet to be sure that the shipments to this country will be large nex season. Looking at the various trades, it may be said that th shipments for Calcutta have fallen off since the failures in th Eastern Trades, and few or no houses will speculate in freights o this side. At this moment freights for sailing ships have risen and Californian rates are good, but are not likely to continue "Many men, many minds," is peculiarly applicable to shipowners Each acts independently, having his own theories and his ow interests to follow out. Powerful companies like the Peninsula and Oriental, and the Messagéries, and those whose steamer regularly leave London and Liverpool, monopolise a larg share of the carrying in the East India and China Trades Calculating the number of voyages of each steamer, th carrying capacity is very large in the aggregate, the size c steamers having increased. Add to this aggregate the additiona carrying capacity of what may be called outside steamers, built fo any trade and ready to steam anywhere a demand may arise, tremendous supply is at once at hand, tending to keep freight low, largely in excess of any ordinary demand, for it must b remembered that the telegraph reports the freights each day fror all foreign ports, and merchants can arrange charters by the sam means on this side for their forward or late shipments just as i suits them. It is seldom that a pressing demand arises or continue for steamers in any one port, so that a low rate is generall maintained.

Sailing ships now are under great disadvantages, owing t the Plimsoll agitation and other causes, and have learnt a very sa lesson for the last two years in Calcutta and Bombay from th opposition of steamers and the unremunerative state of th Colonial Market here. The new combination for the Chin Trade and Australian Trade, if it could be carried out in othe trades, would secure both to steamers and merchants a suppl and demand suiting everyone, but it is too blissful a state t hope for, and might even become an unbearable monopoly. Th rice trade employs a greater proportion of sailing ships as compare with steamers. English iron ships, and Italian and Norwegia

ships go in heavily for it, and are chartered this year at about 35s. for loading in February and up to April. In fact arrangements are made here before the crops are in the ground.

The grain business from the Black Sea, Danube, and other parts of that coast has heretofore been supplied by moderate-sized sailing ships and steamers carrying from 3,000 quarters up to 6,000 or 7,000 quarters. The freights are so low in Russia that steamers, even with the assistance of a cargo out from this country to a port direct on the way, barely show a profit on the voyage. Many vessels have now joined in the competition carrying 12,000 and 14,000 quarters, although more suitable for America, India, or any other trade by reason of their small registered tonnage, as compared with their carrying capacity. Yet America with her export of grain and cotton at present attracts much tonnage, and sailing vessels of all nations, as well as steamers, are flocking there chiefly in ballast, for the harvest is good and Europe needs the grain. The freights are fair but not at all out of the way, even for summer trips.

The Baltic trade has been a poor one, and the Montreal and Canada season has shown no briskness this year. Steam to Australia has begun a new era and must answer, but at the expense of the sailing ships. Sailing ships to New Zealand at present hold their ground during the season, which is limited, but the trade is a complete monopoly. New Zealand will however benefit by the steam to Australia, by having a line of its own to meet the steamers, and thus take away from the sailing ships much of the passenger trade and light goods. In the opinion of most men sailing ships can only live in certain trades, such as the San Francisco wheat trade, guano, Adelaide grain, and other trades where steamers cannot compete on account of the rates of freight and uncertainties of the trade; for it must be remembered that when losses occur cash has still to be paid for wages, port charges, and insurance, and at best reimbursement only comes at the end of the voyage, when the freight is received, so that owners ought to have a reserved capital to meet this independently of all other liabilities.

It may be well asked, after these remarks, what can put shipping into a better position than at present, particularly when little

has been said about foreign shipowning? Germany, Ital Norway, and America have their steamers and sailing ships, Ital and Norway having gone ahead very largely by the returns mad of last year's building. Norway is suffering very heavily, an those who know how much she has invested in shipping must fe that English capital or advances are invested in it. Italy sails he vessels mostly on credit, by mortgaging the freights before earne large financial establishments being in existence for that purpos advancing on bottomry the freights to this or other countrie collecting the freights on arrival of the ships, through their co respondents, to whom they remit their bottomry bonds to me their bills drawn on credits given by them on this side, and b means of which the advances are made in the first instance, ther fore English capital really assists to promote competition in shi ping. The increase of steamers and ships in Denmark is ver remarkable.

The removal of the depression in British shipping cannot b effected by legislation, but a step has, we learn, already been mad in some financial circles. It has been reported that in Glasgo the banks will not advance money to shipowners without securit other than the ship. The unsound state of the shipping trad will, however, never be remedied until every banker who ha advanced money on shipping, and every person who holds a mor gage; insists on registering or even on realising their securitie Borrowed money cannot in the long run materially aid the own while his vessels are earning no money to pay the loans of whilst those who have lent it have a depreciated security year aft year. Some banks are running steamers on which they have a vanced money. These steamers are sometimes sailed under th names of brokers as owners. The shareholders of those bank should look to this and realise, if and while they can, at profit.

The first remedy we can suggest is inquiry and caution befo investment. Further, an investor should have nothing to do wit a ship unless he is sure that all bills of sale and mortgages ar registered when given, so that the status and financial position o the owner can be easily ascertained, and losses to creditors an

co-owners provided against. Let co-owners in every ship or steamer meet and limit the cost of management to a fixed sum, to include brokerage, and let every "commission" be placed to the credit of the owners. The effect of this would be to secure management unprejudiced by conflicting or opposite interests. It should be remembered that the law is very stringent indeed on anyone acting for others in a joint venture, who receives profits outside the general fund for distribution. Many trials in courts of law will show this.

Brokers who have ships or steamers of their own should bear the honourable distinction of shipowners, and make it their sole business, as some now do.

Let builders return to their legitimate mode of payment, viz., by instalments at certain stages of the building, and the balance on delivery of the ship. Let bankers object to take long date bills for advances unless for legitimate purposes, and refuse renewal unless they are entered in the register book as mortgagees. With these fair and reasonable precautions, shipowning would become a fair and profitable investment, and take its stand as a separate and distinct business, as it does in many places, and would meet with the old success.

In the foregoing remarks we have not said anything likely to lead to mistrust of well-established lines and businesses. The public can safely invest in steamship companies and in steamers well managed: but let investors in other vessels refrain from being misled by statements as to inordinate profits, and insist on knowing with whom they are associated as co-owners, so as not to run the risk of having to pay for them.

DISTINGUISHING LIGHTS FOR LIGHTHOUSES.

THE letter from Sir William Thomson, on the subject of "Distinguishing Lights for Lighthouses," and the leading article thereon, which appeared in the *Times*, of the 2nd ultimo, have re-opened a question which has several times been brought forward since Mr. Charles Babbage, the renowned mathematician, in 1851, first ventilated his theory, that every lighthouse should, by systematised occultations or eclipses of its light, be made to indicate periodically its own number from sunset to sunrise. This proposition apparently did not find favour with those interested in the lighthouse system at that time, and after lying dormant for over twenty years, the question was taken up by Sir William Thomson, who, in a paper contributed to *Good Words* in 1873, with the somewhat ambitious title "Lighthouses of the Future," strongly advocated the introduction of a system by which the dots and dashes of the Morse Telegraph Alphabet should be made available for enabling each lighthouse to indicate itself. Sir William Thomson's efforts on this occasion do not seem to have met with any more success than that accorded to the proposals of Mr. Charles Babbage, and although the subject has several times since been brought before the public, it appears to have awakened but little enthusiasm, nor has it at any time sufficiently interested seafaring men to induce them to take any definite action in the matter.

At length, however, Sir William Thomson has succeeded in obtaining a champion no less powerful than the editor of the *Times*, who has not only published a very long letter from the distinguished man of science, but has also devoted a leading article to the consideration of the subject. The question being thus prominently brought before the public, it becomes of some importance to enquire more fully into its merits, and to ascertain, if possible, what is the cause of the apathy and inaction which have followed every public reference to the subject since the time of Babbage.

From the letter in the *Times* we learn that what Sir William desires is "a three-fold reform in our lighthouse system," viz.,

(1) "a great quickening of nearly all revolving lights; (2) the application of a group of dot-dash eclipses to every fixed light; and (3) the abolition of colour as a distinction of lighthouse lights except for showing dangers and channels and ports by red and white and green sectors."

As regards the first of Sir William Thomson's propositions, it is probable that nautical men will generally agree with the principle that the periods of darkness in revolving lights should be made as short as possible. The desirability of this has long been admitted by the lighthouse authorities themselves, and the long intervals of darkness which were in vogue fifteen years back have since then from time to time been considerably shortened, so that at the present moment there are, on the British coasts, only two revolving lights pure and simple whose entire period reaches two minutes, including the length of the duration of the light, the dark interval being about 1 minute and 45 seconds. This of course is a long time for a seaman to have to wait, and no doubt makes the picking up of the light more difficult than if the light recurred more frequently. It should however be remembered that the light while it lasts is of great intensity, that as soon as it is sighted it is unmistakeably distinctive, and that at Beachy Head and Lundy, where these two-minute lights are shown, the range of the lights is so great that the mariner can pick them up long before he approaches any danger, and when he has plenty of room to move about and plenty of time to make sure of his position. If however these lights were intended to mark narrow channels or dangerous reefs or shoals, it would be absolutely essential that the illuminated periods should recur more frequently. Sir William does not bring forward evidence from practical mariners of their disapproval of either Lundy or Beachy Head lights on the score of their lengthened intervals, although no doubt many would say that if it were possible for the dark intervals to be shortened it would be advantageous to do so, provided it did not interfere with the distinctive characters of the lights, and to this extent we are at one with Sir William Thomson, although we do not think there is so urgent a necessity for the change as he would make out. But it is with the numerous one minute revolving lights of the English Channel

that Sir William Thomson chiefly finds fault, and he thinks that it would be an unspeakable improvement if every one of them had its speed sextupled, and he would then apply the system of long and short flashes to enable each light to signal its own number or letter continually.

He proposes, secondly, that every fixed light should be distinguished by a rapid group of two or three dot-dash eclipses, the dot to be of about half-a-second in duration and the dash three times as long as the dot, with intervals of light of about half-a-second between the eclipses of the group and of five or six seconds between the groups.

Sir William thus practically merges his first proposition into the second. He would quicken the speed of all revolving lights, and introduce rapid occultations into all fixed lights in order that the dot-dash system may be applied to both. It should be observed, that for the revolving lights he would make the flashes of light do the duty of making the long and short signals, while, for the fixed lights, he proposes that the occultations, or dark intervals, should be employed for the purpose.

The first thing that occurs to the nautical mind is that in the event of the adoption of Sir William Thomson's scheme, it would be necessary for all seamen to be acquainted with the Morse Alphabet, which consists of twenty-six combinations of not less than two and not more than four long and short signs.

We are of opinion that in the present condition of education it would be out of the question to expect any seaman to commit all these combinations to memory; it would be, for him, a most difficult accomplishment, and can only be achieved at all by persistent application and continued practice in the use of the symbols. But it may be said it would not be necessary that seamen should learn the alphabet by heart; it would be sufficient if they had at hand a card to refer to by which the signals might be read off. We do not, however, think this plan would be agreeable to the mariner.

Again, the change would necessitate an alteration in all the published Lists of Lights and in all charts of the coast. The mariner would want to know what was the letter appropriated to

each lighthouse, and it would be necessary for that letter to be added whenever the light was described or referred to. This also would be source of inconvenience to seamen, and would not be welcomed by them.

Moreover, as there are only 26 distinctions available by the Morse alphabet, and as, according to Sir William Thomson, the number of lights on our coasts exceeds 600, it would be necessary to repeat the alphabet about twenty-four times in order to give every light a letter. It is difficult to see how confusion would be avoided in the case of the lights on the East coast of Ireland and those on the West coasts of England and Scotland; and there is no doubt that the lighting arrangements of the North coasts of France, Belgium, and Holland would be seriously interfered with if the proposed system were to come into operation on the British coasts.

Again, the mariner would also have to remember that sometimes the signals would be conveyed by means of long and short flashes of light, and sometimes by means of long and short intervals of darkness. In the one case, continuous darkness would be broken by flashes of light; in the other, continuous light would be broken by flashes (so to speak) of darkness. To mistake the one for the other of these two classes might be disastrous in the extreme, and to our thinking it seems that as the sailor's mind would be bent almost entirely upon making out the dots and dashes, he would be apt to confuse the two classes, and might substitute one for the other.

But assuming, for the sake of argument, that these preliminary hindrances to the application of Sir William Thomson's proposal could be all satisfactorily overcome, the question then arises: What practical advantages would the mariner derive from the special forms of distinction proposed? In the place of the present highly varied system, he would find all the lights perpetually bobbing and jumping, and each by its continual Jack-in-the-box movement, firing off the necessary groups of dots and dashes to signalise the letter which may have been appropriated to it. Sir William makes no provision for any other kinds of distinctions to be used, and would abolish the use of colour except for sectors for local purposes, so the mariner would see nothing but white

lights continually on the move. It is true that they will differ from the masthead lights of steamers under way, which appears to be one of the chief objects aimed at, but the anchor light of a vessel rolling ever so little to the action of the waves is always liable to be characterised by what may be termed occultations produced by the interference of masts, rigging, sails, smoke, steam, or passing vessels, and although the occultations so produced might not be regular, yet they might be sufficiently marked to cause considerable doubt in the mind of the seaman as to what light it could be, and to involve a great loss of time in his endeavours to find out.

But another great advantage which Sir William Thomson claims for his proposal is, that it will greatly facilitate the picking up of a light in comparison with the means offered by the present system of distinctions.

We have already shown that the adoption of the proposed system would involve the shortening of the duration of the flashes themselves, even to such short periods as one second and half-a-second; and it is probably believed, on the other hand, that the increased frequency of their recurrence would obviate any inconvenience which might be caused by reducing the duration of the flash to such exceedingly short periods. But it must not be forgotten, that the construction of the optical apparatus of the revolving lights now in operation is such that it will not admit of the flash being reduced without a considerable loss in the intensity of the light. A flash of some seconds' duration sent through a panel of, say, a six-sided apparatus, consists of a great amount of light gathered up into a powerful beam; but in order to produce these rapidly recurring flashes, the body of light falling upon the panel must be cut up into a great number of very small sections, and the light sent through each section would be, in comparison with the large beam transmitted through the entire panel of 60°, weakened in proportion to the reduction of the angle into which the light is gathered. But, besides this, a mechanical obstruction exists which would make it extremely difficult to apply the system of short and quick flashes to existing revolving lights. It would either be necessary to completely alter the optical arrangements (which would involve an enormous

expenditure), or the apparatus would have to be rotated so rapidly that one man would be chiefly occupied in winding up the clock-work, to say nothing of the inconvenience, risk, and wear and tear with which so rapid a velocity of the glass apparatus would be attended.

But, under any circumstances, the intensity and penetrating power of the light would be lessened by the adoption of quickly recurring short flashes. The mariner thereby would lose the power, and possibly the visibility of the light, for the sake of gaining the dot-flash system of distinctions. At times when the light would be most required, its intensity would be enfeebled, and through haze, rain, or snow, he might with difficulty make out faint blinkings, which it would require the most careful observation and thought to interpret. We ask our readers, the majority of whom know practically what is wanted, will they sacrifice intensity of light for the sake of a new code of distinctions? and would the mariner be assisted in picking up any given light by its change to rapidly recurring but enfeebled flashes?

But we have another point to make against the dot-and-dash system. What the mariner really wants is a light which immediately it is sighted proclaims to him its own individuality. This would not be the case with the dot-and-dash system of signalling, even though the Morse Code were as familiar to him as the letters of the alphabet. Sir William Thomson, on board H.M.S. *Northampton*, or his own comfortable yacht, would no doubt be in a position to devote all his attention to the minute observance of lights. In his letter to the *Times* he admits that when criticising the performances of some of the channel lights, his mind was free from navigational anxiety, and as a scientific observer he has devoted himself entirely to the question.

To Sir William Thomson the Morse Alphabet is "as easy as A B C," he can see no difficulty in reading the signals—his mind is full of it—and what is so simple and intelligible to him must, he appears to think, be equally comprehensible to everyone else. But we must remind Sir William Thomson that merchant sailors are not all scientific observers, nor able to sympathise with ingenious scientific theories. However competent the commanders and officers

of our great steamships may be to appreciate a complex system o signalling, it must be borne in mind that the lighthouses of ou coasts are also intended for the use of thousands of men to whon the details of short and long flashes, the Morse Code, &c., woul be merely so many additional perplexing elements in the perform ance of the business of their lives.

Imagine the master of a small trader, on a rough night, with his min full of the hundred and one matters connected with the navigatio of his vessel, yet anxious to assure himself of his position; woul he wish to add to his already burdened mind the task of deciphe ing the meaning of what would appear to him, at first sight, to b a very rapidly blinking light. To do so he must give up for th time all thought about his ship; he must concentrate all hi faculties on the light; he must find out first the number of flashe or occultations in a given period, and must then decide which c them are long and which are short; having after repeated observa tions satisfied himself on this point, he must then remember c find out what letter is symbolised, and having accomplished th must then recollect or search out to what light the letter in questio is appropriated. And all this it would be necessary for him to d at a time when the light was just showing above the horizo and he was in an anxious state of mind, wishing to verify h position. We venture to think that practical seamen will regard th multiplication of the efforts necessary to determine the name of lighthouse as a fatal objection to the introduction of such a syste of lighthouse distinctions. If every nautical man had the Mor Alphabet at his fingers ends; if the signals could be conveyed wi the greatest certainty and intelligibility; if the short flashes of lig retained the intensity which the longer flashes possess; if the mi of the sailor were in a state of absolute certainty as regards t "flashing" system and the "occulting" system; and lastly, the existing system of distinctions were so lamentably deficient to provoke the outcries of those who require to make use of t lights, and to lead to disaster, then we would be disposed to lo with more favour on the proposition of Sir William Thomson, a the necessities of navigation would, no doubt, call for its adopti if nothing better opposed it.

But our readers will probably ask: What does the present system consist of? To this we answer that it appears to be a combination of many systems by which an effective variety of distinctions is obtained. But one great merit pervades the present heterogeneous collection of distinguishing characteristics. Every light says at once what it is; there is no code of symbols or letters to be interpreted—the Wolf Rock Light is revolving, showing a red and a white flash alternately every half minute; the light on the Mull of Galloway in Scotland is intermittent or occulting, showing a fixed light for half-a-minute then eclipsed for fifteen seconds; the Calf Rock Light on S.W. Coast of Ireland is flashing, showing a flash every quarter of a minute; then there are fixed lights, red and white; revolving, white or red or green; double lights shown from one tower; or from two lighthouses a short distance from each other; electric lights which are very distinctive; sundry combinations of fixed and flashing; and a system of recent introduction known as group flashing, whereby two or more flashes in quick succession are repeated at certain periods. The above characteristics and their combinations, varied by time periods ranging from ten seconds to two minutes, afford a much larger number of distinctions than could be obtained by the dot-and-dash system alone, with the advantage that the seaman knows at once what he is looking at.

We do not pretend to affirm that the lighting arrangements on our coasts are perfect; there are doubtless many improvements which may be made, particularly in the general direction indicated by Sir William Thomson in regard to shortening the period of darkness in revolving lights. But, in the absence of complaints from seafaring men, it may fairly be assumed that the arrangements are generally effective and do not call for any revolutionary change. The steady progress made during the past twenty years in all that relates to lighthouse illumination, the increased efficiency and number of lights, the development of sound-signalling for foggy weather, the improvements in and increase in the number of buoys, afford sufficient reasons for the nautical community to be satisfied with what is being done for them, and explain the apathy with which they have regarded the efforts of even a distinguished man of science like Sir William Thomson to bring about a scheme which does not

appear to them to be necessary, and does not commend itself to their practical judgment.

But in one respect we think there is undoubtedly room for improvement. The nomenclature of the different kinds of lights requires to be made more intelligible and more definite than it now is. In the Admiralty List of Lights the following summary is given of the various characteristics employed :—

"(1.) *Fixed, or Steady.*

"(2.) *Flashing.*—Showing flashes at short intervals, or group of flashes at regular intervals.

"(3.) *Revolving.*—Light gradually increasing to full effect, then decreasing to eclipse. [*At short distances and in clear weather a faint continuous light may be observed.*]

"(4.) *Fixed and Flashing.*—Fixed light with addition of whit or coloured flashes preceded and followed by a short eclipse.

"(5.) *Intermittent, or Occulting.*—A light suddenly and totall eclipsed. When light between eclipses visible less than thirt seconds term occulting applied. When light visible longer than half-minute, term intermittent applied.

"(6.) *Alternating.*—Red and white light alternately at equa intervals, without any intervening eclipse."

The terms employed above no doubt express very clearly to th authorities the different characteristics of lights; but the majorit of nautical men would have some difficulty in accurately definin each term. Some of the expressions are entirely unknown t many mariners, and, as regards the terms "revolving," "flashing," "intermittent," "occulting," and "alternating," there are, we ar sure, few sailors who could tell the difference between them. A far as we can judge, it seems that *all* lights which come and g are among mariners known indiscriminately as "revolving," an are distinguished merely by the length of the duration of the inter val of darkness.

If an authoritative announcement were put forth, giving thre or four plain names, which would generically comprehend all th different distinctions employed, and explaining each of the varietie of these divisions in a perfectly simple manner, we think it woul be of the greatest benefit to navigation. It would unquestionabl

remove some of the obscurity and uncertainty attendant upon the use of the present terms, and render still more unnecessary any such complicated code of signals as that advocated by Sir William Thomson.

As regards the third of Sir William Thomson's propositions, viz., the abolition of colour as a distinction of lighthouse lights, we do not think the use of colour should be entirely discarded at present. Some recently established revolving green lights have proved very effective for marking narrow channels, and Sir William Thomson admits that the intensities of the red and white flashes of the Wolf revolving light are very perfectly equalised, "which is quite a triumph of optical science and skill." Now in these cases colour appears to be quite successfully utilised and in such a manner as not to be liable to be confounded with the port and starboard lights of vessels under way. As regards the use of colour for fixed lights, the question deserves consideration as to how far the coloured media adopted robs the light of its penetrating power, and on the other hand to what extent the coloured light resists the obscuring influence of a misty or hazy atmosphere. It is believed by some, as stated in an article,* in this journal in May last on the subject of the Electric light, that the passage of red rays through aqueous vapour is not so much obstructed as is the transmission of yellow, green, violet and blue rays, and Sir William Thomson alludes to a reported case of the white flashes of the Wolf light having been rendered ineffectual in a haze, while the red rays were visible.

This would seem to point to the greater usefulness of red light in thick weather and affords an argument for its retention for lighthouse purposes, as long as it can be effectively differentiated from the coloured lights of vessels under way.

It might be desirable that some definite experiments should be made on the subject of the value of coloured lights and coloured media, so as to enable an accurate judgment to be formed as to the practical efficiency of such means of distinction in varying conditions of the atmosphere. But as far as we can judge at the

* *Nautical Magazine*, May, 1879, p. 376.

present time, it seems to us that what is really wanted is something by means of which a distinctive element can be imparted to coloured fixed lights when employed for lighthouses, so that mariners may not confound them with ships' lights.

It is somewhat singular that for ships' lights, which are of comparatively recent introduction, claims are asserted for distinctive peculiarities which had been in use for lighthouses long before. We of course do not deny the great value of coloured side-lights, but we do think it a little hard that old established lighthouses and their distinctions should be regarded as matters secondary to modern ships' lights, and that the former should have to give way as regards distinctive features to the latter.

THE NEW NAVIGATION AND SUMNER'S METHOD.

A PROBLEM in Nautical Astronomy of no inconsiderable value is gradually taking its proper place among the various methods used by navigators to determine *the position of a ship at sea.* It cannot, however, with any propriety be said to have any claim to novelty; so far indeed from being a new problem, we are warranted in stating that the principle which underlies the method has been recognised for upwards of a century; but in its old form few were acquainted with it, and amongst those few must be reckoned the officers of the old East India Company's ships, who, we have good reason for stating, had a due appreciation of the extent to which its results could be trusted,—above all its general excellence in determining the latitude, though the imperfection of timekeepers and the uncertainty of lunars rendered the longitude but an indifferent approximation to the ship's true position as referred to the meridian of Greenwich.

In process of time, as soon as the chronometer had come to be so far perfected as a timekeeper that, by careful verification (as opportunity offered) of the error and rate, its degree of dependence, in individual cases, was known, the problem began to assume a new form—projection combined with calculation; and it is on record

that skilful navigators were enabled, by utilising only a part of the method, in connection with a sounding, or bearing of a distant inland object, to identify the ship's place on the chart, and thus shape the course anew, or keep on, as required.

It is, nevertheless, undoubtedly true that this problem, which, for more than half a century had come within the ken of comparatively few navigators, and which was more frequently a matter of computation than of projection, took a new point of departure when, in 1843, Captain THOMAS H. SUMNER, of Boston, U.S., published his work entitled, "A New and Accurate Method of finding a Ship's Position at Sea, *by projection on Mercator's chart.* When the Latitude, Longitude, and apparent Time at ship are uncertain, *one* Altitude of the Sun, with the True Greenwich Time, determines, *first*, the True Bearing of the Land; *secondly*, the Errors of Longitude by Chronometer, consequent to any Error in the Latitude; *thirdly*, the Sun's True Azimuth. When *two* Altitudes are observed, and the Elapsed Time noted, the True Latitude is projected; and if the Times be noted by Chronometer, the True Longitude is also projected at the same operation." We give the title in its entirety, because it fully expresses what the problem is capable of determining, provided always that the data—other than the latitude and longitude—are correct, but those approximately known. It has come, in these latter years, to be generally recognized as "Sumner's Method," and the lines of position are sometimes inappropriately called "Sumner lines;" we say inappropriately, because the geometrical name is unquestionably the better. Extracts from Sumner's work were first published in France, by M. Joseph Barthet, in the *Annales Maritimes*, of 1847. Its progress, as a problem in daily use, has been more rapid with us than with our continental neighbours; within the last few years, however, it has taken an extraordinary hold on them, and they have developed it in a new form; from the position by dead reckoning, they calculate an approximate *point*, and then by projection, and the use of several special tables, rectify the position of this point, as that of the ship.

We will briefly explain the principle of the problem.

Latitude alone, or longitude alone, does not indicate the position

of a place on the globe. The first merely shows that the place is somewhere on a small circle (a parallel) at a definite distance from the equator; the second merely shows that the place is somewhere on a great circle (a meridian) that makes a definite angle with another great circle which passes through a fixed conventional place of reference. To know the position of a place the point of the intersection of these two circles—of the meridian with the parallel—must be determined; but this cannot always be done at sea, at any given or required instant, by any of the ordinary rules of nautical astronomy; though it may be done by a combination of rules; or partly by computation and partly by projection; or where a good point cannot be ascertained as that on which the ship is, a line may be found on or near which she is known to be, and this at the time may be priceless. The position of the ship is thus determined by a method of utilising parts of circles which, in their completeness, would be *oblique* to the parallels and meridians.

When the declination of a celestial object coincides in amount and name with the latitude of a place on the terrestrial sphere, it must, at some time during the earth's rotation on its axis, appear on the zenith of that place; it will do so when the object's hour-angle for the place is 0 h., that is, when it is on the meridian. When this occurs, the Greenwich time by chronometer being known, let it be taken as granted that the object is above the horizon of another place; that its altitude is observed, and its zenith-distance consequently known. In Fig. 1 the object is vertical to the point S of the globe; with S as the pole, and the observed zenith-distance, S *a*, as a polar-distance, describe the small circle *a a′ a″* a‴: this is a *circle of position*, on some point of which the observation has been made, for from

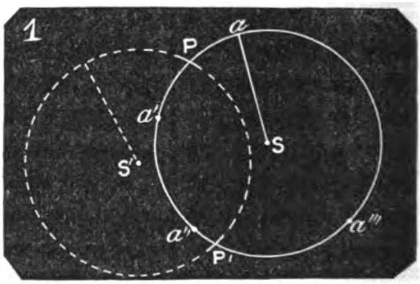


FIG. 1.

every point within or without this small circle, a less or greater

zenith-distance than S *a* would be observed at the instant of the object being at S. "If, then, the navigator can project this small circle upon an artificial globe, or chart, *the knowledge that he is upon this circle will be just as valuable to him in enabling him to avoid dangers as the knowledge of either his latitude alone or his longitude alone;* since one of the latter elements only determines a point to be in a certain circle, without fixing upon any particular point of that circle."—CHAUVENET.

The altitude of another celestial object, S′, taken at the same time as the former, gives a second circle of position (Fig. 1, *dotted circle*). The observer being in the circumference of each of these circles, must be at one of their points of intersection, P or P′: there will be no difficulty in ascertaining which is to be taken, as it will generally be indicated by the dead reckoning.

The circles of which we have spoken are such as they would appear when represented on the spherical surface of a globe, and they illustrate the principle of the problem. On a Mercator's chart, where the distance between the parallels is considerably augmented in the higher latitudes—in order to preserve the proportion that exists at different parts of the earth's surface between the meridians and the parallels—circles of position would be represented as elliptical figures (Fig. 2); perhaps we had better say, as *curves of position*, which, to delineate properly, would require to be computed for every 5 or 10 degrees: happily, in the projection of the problem, we only require a very small part of these curves, for which we assume two latitudes a few miles on each side of the latitude by D.R. We may take the tangent (T) to the curve, or the chord (C); but our computation and projection will be the more perfect the more closely the chord and the tangent coincide—in fact, we shall then have the best *line of position*.

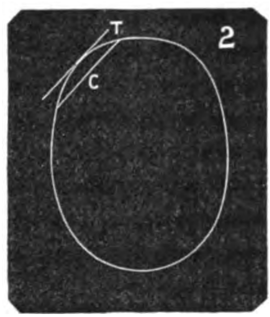


FIG. 2.

It is not our purpose to write the rule for Sumner's Method; we take it that the majority of our readers already know it; those

who do not, cannot too soon make its acquaintance: our intention is simply to comment on its value.

The data for the problem are the correct Greenwich date by chronometer; simultaneous altitudes of two stars, or of a star and planet—by far the best objects to give the ship's position; when the sun is the object there must be an earlier and later altitude, with the sun's bearing at the first sight, and course and distance carefully noted in the interval of the observations; two assumed latitudes, the basis of which must be the latitude by D.R.; and, finally, the elements from the Nautical Almanac; of the latter we have not a word to say beyond this—there is no excuse for taking them out inaccurately.

About the chronometer:—Everything depends upon this instrument, unless we are satisfied to merely get the correct latitude by means of the hour angles. But, really, there is no difficulty in verifying the error and rate. We know that all our regular lines of passenger steamers carry at least three chronometers—some, more; and of those that traverse the Atlantic to the States, the West Indies, Brazil, and the Cape, equally with those that take the route through the Red Sea to India, in which the voyages are short, or at regular intervals, if the Greenwich time is not known on board within four seconds, or less, under every variation of temperature, then all we can say is, that it *ought* to be; and it is certain that all the instruments cannot break down at once; therefore, for these voyages, and for the purpose of making good landfalls, if sights are to be had at all, the problem in part, or in its entirety, is everything that could be desired. The same remarks apply, with almost as much force, in the case of our large colonial traders, when at least two chronometers are carried, since a voyage is rarely accomplished without some well-known spots being sighted, which should be so many landmarks for the verification of the error and rate of the Greenwich timekeeper. But the case is immeasurably different when there is but one chronometer on board, and its accuracy has never been tested during the whole voyage—not perhaps from unwillingness, but from sheer inability, on the part of the master, and towards effecting which his examination for master's certificate never gave

him the slightest clue or help. While we write, such an one "made tolerable landfalls," and yet his chronometer, with the given error and rate applied, we found to be 8m. 17s. slow on M.T. at Greenwich. Who can doubt the danger in which a vessel so navigated might be placed?—for all else being taken to be approximately correct, the error of the chronometer places every part of this problem too far east, or too far west, bodily; and a vessel, put on a line of position, might unsuspectingly be brought into danger on the west coast of Ireland, when supposed to be making for St. George's channel. While expressing our own unbounded confidence in the problem under discussion, we have considerable doubt as to its value in the last case: a master so circumstanced should pay special attention to his latitude, and to the famous three L's generally—therein lies safety; but to take the indications of an unverified chronometer, as if it gave a tolerable line of position, is only to go in search of that which would surely not be found.

Simultaneous altitudes of two celestial objects are unquestionably the best for determining the position of a ship,—which is thus got at once without any change of place or interval of time for which to allow. With a good knowledge of the stars and planets, two objects can be selected at pleasure, and in such relation to each other that the angle between their verticals shall be the best possible—something between 60° and 120°, and so develope a good point of intersection. If there be any doubt, a third star will give, with the two others, a *space* or triangle *of certainty*, within which the ship must be. Taken in the twilight—and how often may this be done when no sun has been visible all day—the altitudes, by a practised hand, ought to be obtained within a limit of 2′ to 3′—less rather than more. Attend to the remarks of Raper:—"The observation of stars at night is a very different observation from other altitudes by day; and, *to ensure success*, the observer should *make it a matter of special practice*. It is, however, *during the twilight* that stars and planets may be most advantageously observed at sea, as *the horizon at that time is strongly marked*, and, when not sufficiently so, may be rendered distinctly visible by the inverting telescope."

When *assuming the two latitudes* it is generally sufficient to

select them about 80′ or less on each side of the latitude by D.R.; this will much depend upon what length of time has elapsed since the ship's position had been previously determined. If the altitudes are simultaneous, and the lines of position (when computed and projected) intersect considerably beyond one or other of the assumptions, then take another latitude a little beyond that of the intersecting point, compute anew for this, and so project again. The position will be more accurately determined in this manner, for the latitude is an important element in the computation of the hour-angle. You will of course reject, as outside the requirements of the problem, in fact as erroneous, all that portion of the computation based on the most distant assumed latitude.

It is not, however, essential that the same assumed latitudes should be used in computing both lines of position; it is only more convenient to do so, as it saves some logarithms. In the case of two altitudes of the same object, as of the sun, where a course and distance have been made in the interval, if the course has been nearly north or south, it would be better to assume two latitudes differing from those used for the first observation, and such that they may be more in accordance with the altered position of the ship.

It is scarcely necessary to warn the intelligent navigator against making an assumption of latitude that shall render the computation of the hour-angle impossible; the sum of the altitude, latitude, and polar-distance can never exceed 180°—when it is equal to that quantity, the object is on the meridian. Still it may happen that no opportunity of observing must be lost; the altitude is taken, and must be used for what it is worth; we may, however, be able to show that when there is a doubt as to the side of the meridian on which it is, it may be advantageously treated as if it were a meridian altitude, and its hour-angle of 0 h. will give one point of the circle of altitude, and a less assumed latitude give the other point; the navigator is lucky if, in very uncertain weather, having got his morning sight, and the provisional observation near noon, he can obtain another and better sight later in the day.

(*To be continued.*)

THE DOMICILE CLAUSE AND AUSTRALIAN NAUTICAL EXAMINATIONS.

THE Colonial Governments having applied to the Board of Trade, some years ago, to have the Australian certificates recognised in England, their request was granted; but, attached to the grant was a stipulation that, to obtain this certificate, the applicant must produce evidence of domicile in the Colonies; or rather, he must produce evidence of three years consecutive service in vessels sailing out of the Colonies.

Now, while granting that England had a right to see that certificates equal to her own should not be granted to men of inferior character; nor to men who might have been plucked at their examination in the Mother country, and who, after failing at home, might go straight out to the Colonies and obtain the certificate which they could not obtain at home; it seems to me that a six months' domicile clause would have met the latter case by compelling them to have the six months more sea-service which is required of them in England, after being plucked in seamanship, before they could again be examined.

But there is a class of seamen on which the clause acts very unjustly. I mean those young men who have found themselves honourably in the Colonies (whether seamen or officers); by the word honourably, I mean those who have been discharged in the Colonies, perhaps from their ships having been sold, or having worked their way out at one shilling per month, who, notwithstanding they hold plenty of V.G. certificates of servitute in home ships, find that they must either take an inferior certificate or fulfil this long domicile clause.

It is monstrous that the action of the Mother country should thus bar a young man's advance in life for three years, who may hold the necessary certificates of service obtained in her own ships sailing out of Home ports; while, at the same time, she allows aliens of all nations to come with certificates of servitude, obtained in their own vessels, and take upon an examination in England an English

certificate of competency, merely requiring that their Consuls shall verify their certificates.

That the Colonies have quietly submitted to this while doing their best to avoid the hardships caused by it, and their success in the latter direction, is probably the reason why the outcry against the domicile clause has not been greater; for, by granting what is called the Intercolonial Certificate, which will enable the holder of it to sail to or from any part of the world, but, on which, whether master or officer, he will not be allowed to ship in his own country, viz., England.

But a master proceeding to England with one of these inferior certificates, can evade the letter of the Act (the thing has been done repeatedly to the writer's knowledge), by getting the holder of an English certificate to ship his crew and clear the ship outwards, and who conveniently takes sick, and is put on shore in the Channel, while the *bonâ-fide* master proceeds on the voyage.

That such stratagems have to be resorted to in order to avoid the hardships of this clause is to my mind only a proof that the sooner the clause is reduced to six months, as far as Englishmen are concerned, the better, or, what would perhaps be better still, abolish it altogether, for it might safely be left in the hands of the Colonial Marine Boards to satisfy themselves of the authenticity of the applicants' certificates, or if they are English ones they could be verified by the Registrar-General in London, and sent out again in something like four months, this would only be necessary in the case of these certificates of which they might reasonably have doubts of their genuineness.

The writer is not making this matter public because the clause has ever affected himself, his own certificate having been obtained in London; but he has a relative who holds a London certificate as second mate, and who has two years' servitude as such in an English ship in the Indian trade, who, from the force of circumstances over which he had no control, finds himself in the Colonies, and, on wishing to pass, is told that he must either take the inferior certificate, or fulfil this clause.

The writer feels sure that the inconsistency of the stipulation only requires showing to the Board of Trade to have it modified in

some shape, at any rate, to those Englishmen who have the above-mentioned certificate of V.G. servitude; for, surely, if England will allow foreigners to pass in England on their foreign service, she will allow her own children (who these same aliens are entering into competition with, and driving from her shores) to pass an examination in her own Colonies upon certificates given under her own hand, and thus obtain the highest certificate that can be obtained without having to fulfil three years more duty.

MARSHALL SMITH, Master Extra,

Member Royal Society, N.S.W.

Port Adelaide, S.A., October, 1879.

THE CAPTURE OF THE "HUASCAR."

IN the last number of the *Nautical Magazine*, there appeared an account of the recent naval engagement in the Pacific. Since that account was in type, the official report of the Chilian Commander-in-Chief has been received in this country. That document, dated Autofagasta, October 10th, 1879, though, as might be expected, it throws much light upon details of the combat, previously rather obscure, corroborates in all important particulars the story as previously related in these pages. In some minor points there is a discrepancy between the Chilian Admiral's letter and the descriptions of the battle published before its arrival in England. None of these, however, are very important. The name of the Chilian Commander is Admiral Rivero, and not Laborre, and the "boarding" by boats' crews, which completed the defeat of the *Huascar*, was apparently not so much boarding as sending men to take quiet possession of a silenced antagonist. A perusal of the report, nearly the whole of which is subjoined, will show that the Peruvian ship was overwhelmed by superior force, that the wooden ships in the enemy's fleet took but little part in the attack on her, and that their two ironclads suffered but little damage. Her engines, also, are declared to be uninjured.

"On arriving at Mexillones, I ordered the squadron to coal and follow me to the southward, as I was informed that Peruvian war-vessels were cruising off the coast of Chili. I left port at a late hour at night, the squadron forming two divisions—one being composed of the slower vessels which kept close in-shore, watching every inlet of the coast; and the other of the fast vessels which received orders to keep twenty or twenty-five miles a-stern, and more or less distant from the land." . . . "This was not exactly carried out, as a telegram was received from the Minister of War, ordering the *Almirante Cochrane* to remain till noon next day with the *O'Higgins* and *Loa*, off Mexillones." This proves that the catching of the *Huascar*, in a trap between two squadrons, was a deliberate piece of strategy, and not an accident. "The *Blanco Encalada*, and *Covadonga*, with the transport *Mattias Cousino*, were to steer south and cruise during the night, not far from the port of Autofagasta. In compliance with these orders, I left Mexillones with the vessels mentioned, at ten p.m., on the 7th, and steered south in sight of the coast. About 3.30 a.m., the look-out man on board the *Blanco Encalada* sighted right a-head two black lines of smoke." These turned out to be "two steamers, which were about five miles off. I gave orders to steer for the two vessels, which immediately altered course and made towards the coast." . . . "At day-break, I discovered that the vessels chased were the *Huascar* and *Union*. Notwithstanding the bad state of the *Blanco Encalada's* boilers, I ordered full steam to be put on, and to steer right down on the enemy. I saw, on observing the speed of the ships we were chasing, that all my efforts would be useless if, as I confidently expected they would, the rest of the Chilian squadron did not interrupt the enemy in his flight. The latter retreated, sometimes steering slightly towards the west, sometimes towards the land, but always keeping a northerly course, and increasing his distance. At about seven a.m., I saw the smoke of a steamer to the north-west. A few minutes afterwards, I was certain that our vessels were making their approach." It is to be noted that the Admiral says nothing of the fog mentioned in the former reports.

"The Peruvian vessels, recognising the danger, put on full steam

and continued their course to the northward, but keeping well in-shore." This, no doubt, was Admiral Gran's manœuvring to get into narrower waters, where he could engage his enemies one at a time. "The distance between the enemy's vessels and ours was at that moment about 7,000 or 8,000 metres. The *Union*, being the faster, visibly increased her distance. The *O'Higgins* and *Loa* were specially directed to chase her." . . . . "Rapidly separating from the rest of the squadron, the ironclads advanced at full speed against the *Huascar*. The *Cochrane* soon shortened the distance between her and the Peruvian. The latter made every effort to escape to the north, but the Chilian ironclad gained fast on her, interrupting her course, when flight being no longer possible it was evident that an engagement must ensue. At twenty minutes to nine o'clock the *Cochrane* was only 3,000 metres distant from the *Huascar;* at about a quarter-past nine the *Huascar*, continuing her flight, fired for the first time at the *Cochrane*. The latter did not return the fire, but continued the pursuit." "Her Commander did not trouble himself about the enemy's fire, but kept advancing till the guns of his vessel could be used with greater precision and more terrible effect. A few minutes afterwards the combat began with both vessels keeping up a hot fire.

"Meanwhile the *Blanco Encalada* was bearing down on the enemy. The *Huascar*, after a well sustained cannonade with the *Cochrane*, turned her prow towards the *Blanco Encalada*, firing at the same time. The *Blanco Encalada* returned the fire. The *Huascar's* flag became invisible for an instant, and it was thought that the combat had terminated; but the Peruvian colours were seen waving again, and the struggle continued. So small was now the distance between the ships, that in our vessel we thought the moment opportune for ramming, but the *Huascar* swerved and evaded the shock. The *Huascar* at one time passed within 25 metres of the *Blanco Encalada*, firing as she did so, and plying her *mitrailleuses* from aloft.

"The *Cochrane*, which had withdrawn during a certain space of time from the *Huascar* owing to the manœuvre in which the latter made against the *Blanco Encalada*, advanced

against her anew, and by able handling placed her between two fires. At this moment the *Huascar*, under a shower of projectiles from our ironclads, was forced to surrender. Almost at the close of the action the *Covadonga* came within range and succeeded in firing one of her projectiles at the enemy. It was then observed that the crew of the Peruvian had become demoralised. While her engines continued working as if trying to escape, some of the crew were seen springing overboard into the sea. On seeing this I ordered the firing to cease and the boats of the ships to be lowered to render aid to those in the water. A launch from the *Blanco Encalada*, under the Squadron Adjutant [? Chief of the Staff], proceeded to the *Huascar* to receive the chief officers. The launch returned in a few minutes after with the sad news that Admiral Gran had been killed by a shot. His body had disappeared. Shortly after his death two officers who succeeded to him were slain." Admiral Rivero says that Admiral Gran's death was much regretted by the Chilian officers, and he pays a graceful compliment to his unfortunate antagonist's memory. He then "attended to the wounded, placed a prize crew on board the *Huascar* and ordered her to steer at once to Mexillones. Her engines having remained in a perfect state, the *Huascar*, with some slight repairs, may fight again under our national flag." . . . "There were twenty-eight officers prisoners, and more than one hundred of the crew."

"This result was obtained with very little sacrifice. The *Cochrane* received two of the enemy's projectiles which struck her in no vital part. The crew had ten wounded, one of whom died, the rest were but slightly hurt. The *Blanco Encalada* suffered neither loss nor injury. The *O'Higgins* and *Loa* chased the *Union* till off the river Loa, but, finding it impossible to overtake her, gave up the chase.

(Signed) "GALVARINO RIVERO."

COAL CARGOES.

IN reference to the communicated article which appeared under the above heading in our last number, we find it incumbent on us to state in answer to several Correspondents, that the views therein expressed are simply the views of our Contributor himself, who wished to have an opportunity of saying a few words more on the subject before the discussion closed. Our own summary of the question which appeared in the magazine for October* last, embraces the essential points of the question, and in our opinion is an impartial and complete statement of the case. We think it necessary to make this announcement in consequence of some of our Subscribers having been under the impression that the communicated article of last month was intended as a rider to or qualification of the editorial summing up, whereas it was merely a few further observations from the author of the original paper which provoked the discussion, further explaining the position he had taken up. It in no way modifies our view that the Report of the Royal Commission is substantially right; and we once again urge our readers to use every endeavour to adopt the precautions recommended in that valuable Report.—Ed. *N. M.*

LITTLE PROBLEMS FOR YOUNG OFFICERS.—No. I.

TAKE a sheet of paper and draw a line horizontally across it from W. to E. On this line and near the left-hand edge of the paper draw a ship (A), heading N.

Then, with a pair of compasses or a rule, measure along the line a distance of six inches, at which distance draw a similar ship, (B), also heading N. The ships A and B are at anchor, in a current which is flowing from N. to S.: they are broadside to

* *Nautical Magazine,* Vol. 48 (1879), p. 843.

broadside, six knots apart. Alongside (port-side) of ship B is a third ship, C, lashed to B. C is a screw steamer and wishes to take an important letter from the captain of B to the captain of A. Assuming that there is no wind, and assuming that the steamer, C, goes neither to the right nor left of a straight course, with her helm amidship, in smooth water, what course will have to be shaped by C so as to enable it to go from B to A without varying her helm; and what will have to be the speed of C on that course, if the current is running N. to S. at the rate of ten knots an hour? Further, what will be course and speed if the current is running at five knots an hour? Further, what will be the course and speed of C if the current is running two knots an hour?

There will be a series of six problems.

Answers to this one must contain a diagram of the ships in their first positions named, before C moves from B, and must state the courses in degrees west of N., and must give the speed in knots per hour.

All answers should be addressed to the PROBLEM EDITOR, "Nautical Magazine," 15, Great Queen Street, Lincoln's Inn Fields, W.C.

Those who answer the whole six correctly will receive a written testimonial or certificate.

ATLANTIC VOYAGING AND GRAIN-LADEN VESSELS.

(*Communicated.*)

SINCE the harvests have failed in this country and on the Continent, freights have ruled high, and many steamers, whose construction scarcely warranted their crossing the Bay of Biscay with an ordinary cargo, have been employed in the grain trade of Baltimore or New York. Their fate, under the conditions of weather which sweep the Atlantic in winter, is not difficult to predict, and the ominous words, "Missing since," &c., &c., are now only too often posted at Lloyd's. Such

events are looked on as transactions in the ordinary course of business amongst insurers. "Deuced unfortunate, certainly, but it cannot be helped, you know." And yet each of those announcements may perhaps indicate that a score or more of English seamen in the prime of manhood are lost to their country and friends. It is of no avail to say that men are not forced to join these dangerous vessels. Necessity has no law, even if those concerned were aware by technical or practical knowledge of the risks they run. "I'd as lief be drowned as starved," is an expression which of late has been too often heard in the waiting-rooms of the Sailors' Homes and Shipping Offices in our great maritime ports. If shipowners and shipbuilders were thoroughly conversant with the peculiarities of the trade for which they were designing ships, many valuable lives and untold wealth would be saved to the world. But, while the shipbuilder and shipowner may not be aware of the dangerous points of many of the iron steamers of this country, the great corporations who class them as well as colonial ships stand in a different light, bearing as they do on their books experts of every denomination—the engineer, the shipwright, and the sailor. An indispensable condition of a safe grain ship is that her timbers should be properly formed and clear, in order that the water may flow freely to the pump-well. But as a rule if the masters or officers of such vessels are asked to explain by what channel the water reaches the foot of the pump, the reply is—"I don't know; never thought of that before." Not a winter passes without seeing a number of abandonments resulting from neglect of this point. Here is a chance for the insurers to step in, for legislation is powerless to act in such cases. It is also not uncommon to find keels without rabbets for the garboard strakes in ships of 800 tons, the cant timbers without seatings, the keel scarphs without tablings, and the tenons of the stem and stern-posts barely sufficient for an ordinary gate. Age, and the decay of fastenings, loosen these important parts of the hull; water enters freely in heavy weather, and the chapter ends. Occasionally, in the smaller class of vessels, one may be found without rabbets to the stem and stern-posts, the ends of the planking being simply shaped off to make a caulk. Here, as in the garboards,

when thus fitted, the iron and oakum of the caulker act as wedges to force the planks from their fastenings. There are other defects of construction which go to swell the seaman's death-roll in colonial-built ships; but the above are of the most importance, and arise generally from ignorance on the part of local builders in the remote districts of the Colonial Empire. If, however, the great shipping corporations would sternly refuse to class a vessel with such dangerous points, a change for the better would set in steadily, and a serious risk to life and property be averted. Men who go down to the sea in ships have enough of the inevitable to contend with in their arduous profession, without being racked by the unnecessary anxieties attending inherent defects of construction or equipment, such as short doublings, improperly cut sheave-holes, and a lack of proper proportions in lower or topsail yards. The ordinary rule for the latter is one quarter of an inch in the diameter at the slings to a foot in length, and the diameter at the yard-arm half that at the slings. There is nothing objectionable in these proportions save that the taper commences too soon. This is evident from the fact that lower-yards generally go in the quarters, although, by the laws of mechanics, they ought to break in the slings.

Steamships in the Atlantic grain trade are not safe in winter without a spar-deck and a main-topsail. As a matter of fact, on leaving the American coast with a grain cargo, they are invariably loaded down to what sailors call their "bearings," and if this is exceeded the men steadfastly believe that the displacement increases in a higher ratio than the amount of weight put on board warrants. No amount of mathematical reasoning can shake this assumption, which may, therefore, be deemed an article of their faith. Of course this belief has no connexion with spare buoyancy, and it is simply mentioned to show how strongly traditions are handed down on shipboard. Now the majority of the ships built on the east coast of England are fitted with a poop, forecastle, and bridge-house amidships. In many the latter is not bulkheaded across the deck, thus giving a clear passage fore-and-aft to the sea. A few years since, the engine-room skylight was a flimsy wooden structure fixed on an ordinary coaming, but since the *London*

foundered, iron bulkheads, running up to the bridge-deck, have come into general use, and, consequently, one great element of danger removed. This at any rate prevents their filling the engine space from above, an event which was quite probable a few years since.

Theory is, after all that may be said, only the short-hand of practice; and it may not seem irrelevant to narrate the particulars of a passage from New York in a steamer of this class. Circumstances compelled the writer to embark in one some sixteen years back, at a period when the maritime part of the city was practically in the hands of crimps, roughs, and river-thieves. It would be difficult to decide which particular branch of the fraternity carried out their profession with the greatest audacity. A ship on hauling into dock was systematically boarded by the crimp, who ordered the men to "knock off work" and come on shore. Her Majesty's consul, owing to there being no consular treaty, was powerless to help the shipmaster in apprehending deserters, and thus, when his vessel was laden, he had to bargain with the crimp for runners. When about to haul into the stream, the latter were marched down in charge of the crimp's private police; and with the letting go of the last hawser, his responsibility ceased. If from unexpected circumstances the anchor was let go, it was not uncommon to lose half the number by desertion—regular commissioned boats being on the look-out to drop under the bows after dark. In this particular instance a vigilant look-out prevented the manœuvre, and the crew, such as they were, made the passage to England.

The steamer herself was about 1,300 tons gross register, and fitted with a poop, forecastle and open bridge amidships. In the sides the cabins of the officers were built, leaving a broad gangway between their doors and the engine-room skylight. The bulwarks were of iron, about five feet in height, with two ports of a side on the quarter-deck, and an equal number forward; but, owing to the sheer strake being carried up a foot or more above the upper deck, the clearance was very deficient. There were about as many scuppers as ports, and freights ruling high, the vessel had been brought down until the wash caused by the paddles of the river

steamers ran gurgling through them to the upper deck. Load-lines and disks were not then in vogue to prevent overloading, and seamen, so long as they had a good forecastle, seldom troubled themselves about the depth of the clear side. However, she had two important points in her favour: the masts, sails, and rigging were new, and the officers splendid seamen. The boatswain was an old man-of-war's man; one of that type which made England famous; and one of those who, alas, too often deserted in early manhood, to repent in old age of the folly. By reason of some little hitch on a wages question, the ship had been seized, sheriff's officers put on board, and a notice put on the mainmast. By some arrangement with the lawyer the bailiffs were, however, induced to go on shore; but had not a ruse enabled the master to slip by the guard-ship, trouble would have ensued for lack of a clearance from the Customs.

On reaching the Bar light-ship the pilot was discharged, with a small bundle of letters for the mail, it being evident that the steaming qualities of the —— were of a very indifferent character; still, every one felt confident, on looking up at the symmetrical brig-rigged masts, that, come what would, they might be depended on. An inspection of the motley crew somewhat damped the opinion formed, for it was doubtful if, with the exception of a seaman from a Cunard West Indian steamer, such a set were ever met with in an English ship. The war of secession was at its height, Washington had been threatened, Semmes had almost swept American commerce from the ocean, and the large bounty or the conscription had drawn all who were worth having into the ranks of the American Navy and Army. On choosing for watches it was found that only three could steer, the remaining portion being principally made up of deserters, or discharged soldiers, from Mead's army. One of these had lost three fingers of his right hand by the cut of a cavalry sabre, and was turned on the world to beg or starve, as chance should will it. Another was by profession a practitioner of homœopathy, a tall, gaunt creature who might have lived on his drugs for all the flesh that was on his angular bones.

Fortunately, the first six days of the passage were unusually

fine for the end of November; and on passing Cape Race the chief officer remarked, "If I were to tell some of my old shipmates that, when rounding Cape Race, I was painting ship at this time of the year, they would think I was romancing." However, on emerging from under the shelter of the land, it became evident that a change in the weather was at hand, and precautions were at once taken to make all snug before the gale came on. This took several hours, owing to the helplessness of the crew, some of whom had already gone on the sick list. By daylight on the following morning it was blowing hard; but the expenditure of nearly a week's fuel had made the steamer somewhat buoyant, enabling her, under close-reefed topsails and foresail, to keep fairly before the sea, so that no great quantities of water rolled inboard. Later on the wind drew to the northward, and with infinite trouble the foresail, after being hauled up by the aid of a steam winch, was secured, every one, captain included, going aloft. It was an anxious night for all on board, and towards morning the order was given to run dead before the sea. This course was adopted in preference to rounding to, it being the general impression that, if the vessel fell off, the sea would break on the bulwarks and swamp her. As night came on the scene was grand beyond description. The huge Atlantic waves, some 200 feet apart, came up a-stern, with their huge breaking crests glistening in the moonlight, and as they rolled along on either hand, it appeared that one could easily touch their green sides. The second officer said, "This reminds me of the time when I was a boy, looking from the cliffs on the Cornish coast at the gulls as they swam between the waves during a gale." Verily, the remark was not misplaced, the ship, with the full moon shining on the tiny sails, bore out the simile so aptly and poetically made.

All who follow the sea have noticed that some peculiar accidents on shipboard appear to be communicated to the crew in an unaccountable manner. A man falls from aloft, and the dull heavy thud is heard and recognised in the most remote places below, while the falling of a spar would not, under similar conditions, attract attention. The words of command, in shortening sail, pass unheeded, except to those concerned; but the cry of a man

The sea and wind had both risen during the night, the former hissing by in showers of spoondrift. Men held their breath as wave after wave came rolling up, and felt a relief as they surged beyond the forecastle. It was impossible that this could go on without mischief, and at last the crisis came—one heavier than usual broke over the poop, and for some seconds no one knew what had happened. The Cunard man was at the helm, and those who were forward alleged that the crest rose above the truck of the ensign-staff, forming a green back-ground to a picture that imagination fails to realize. When the water had cleared away he was still at his post, coolly moving the spokes, although no one ever expected to see wheel or steersman again emerge from that hill of water. Every boat was smashed, the skylight levelled with the deck, the waist full, and the hull fairly reeled under the additional weight. Another wave came on; the captain looked aft and said, audibly, "foundered at sea!" However, it broke short, and before the next came up the decks were clear. As a last resource the foresail was ordered to be loosed to increase the speed by sail-power. At this critical moment the chief engineer came aft, and with his accustomed coolness said, "The stoke-hole plates are washed up; the only *two wooden washplates* are gone; the pumps will not catch from incessant rolling, and if you cannot steady the ship she must founder. The firemen are scared, and were it not for my mates would long since have cleared out." This officer, at a time when hope was almost gone, and with not even the feeling that the world would know how manfully he had remained at his station under such trying circumstances, never blenched or ceased encouraging his scared crew to fulfil their duty. To run the ship in such a storm, with a quarterly sea and wind, was indeed a last and desperate resource; but the writer had, on a former occasion, seen it successfully carried out, under similar circumstances, off the Isle of France, in a sailing ship. The yards were therefore braced forward by the officers and a moiety of the crew—more than half had retreated to their berths—and now all that could be done was to watch the sea, keep off when an unusual heavy roller was advancing, and trust to Providence for the result. We knew that our lives hung on a

thread, but so long as that thread remained intact a determined few worked on unceasingly. The engineer had not come up a minute too soon to save the ship. All the foremast plates were up, the fires low, the waters washing violently with the roll from side to side, by reason of the absence of wash-plates, until it sometimes cascaded over the head of the tallest man. It was a hard struggle, such as no one who has not been thus placed can comprehend. Just as a plate had nearly the last wedge inserted, a heavier lurch than usual would wash all up, or a chance sea, striking the quarter, make men pause, with mall in hand, as the hull shook under the blow. In the end, perseverance, as it often is, was crowned with success, and our hearts grew lighter on reaching the deck to perceive that the gale was breaking fast, the clouds hardening in the north-west, and that emblem of mercy, a brilliant rainbow, spanning the clearing horizon. If the designer and builder of the vessel could have been suddenly transported from their offices to the ship during this gale, how much they might have learned; but strong in self-confidence they take no heed of the counsel of experienced sailors and engineers. Our gallant neighbours, although failing to inherit that aptitude for the sea which stands out in such a marked manner in men of Saxon race, compel all naval architects in the Republican navy to serve a part of their time afloat. Is it too much to suggest that such a course of training for designers and builders of ships might possibly be of service to the Royal as well as the Mercantile Navy of this country?

It is no disparagement to the genius of one of the greatest of marine engineers of the age to say that had he had such experience, many ships which are now rotting idly at their moorings would never have been in frame, but these failures militate nothing against a fame so boldly and justly earned when other men stood aloof and hesitating.

During the winter of 1878-79 many grain-laden steamers disappeared, foundered at sea, and although the closing part of the latter year has not been marked by severe storms, Lloyd's books bear evidence that even under ordinary circumstances the list of the missing is increasing.

The following list of foundered or missing steamers alone was recently published in the columns of the *Shipping Gazette*, (viz.) *Joseph Pease*, *Telford*, *Bevinna*, *Bayard*, *Yoxford*, *Roscommon*, *Capella*, *Tiara*, *Emblehope*, *Surbiton*, *Zanzibar* and *Homer*. It would be interesting to look over the drawings of these vessels in order that the quantities of water held by certain *culs-de-sac*, might be gauged, to measure the heights of the port sills above the flat of the deck, and to calculate what amount of spare buoyancy was left at various levels. Valuable as ports unquestionably are, an undue importance is often attached to their capabilities, which may be briefly explained. A deeply laden vessel with her bulwarks full of water, when hove-to or listed over from any cause, brings the level of the sea up to, or beyond what it stands at within, thus keeping the port lids closed, or hanging in equilibrium, consequently there are occasions when they, at critical moments, do positive harm.

At some future time we may return to this important subject, and question the correctness of a formula which asserts that by increasing the beam of a long steamer to the proportions of safety, her *mean speed* would be diminished. In perfectly smooth water the law holds good. It is painful to note deck piled on deck, house piled on house, like unto an ancient caraval, save that while the stability of one was perfect, the other is often more than questionable, with grain cargoes during heavy weather. Legislation has effected all that the wise and good can do to save the lives of those "who make the sea their profession;" the remainder rests with the shipbuilder, the shipowner, and the great corporations who watch over both. In conclusion, we must emphatically repeat our certain conviction that no ordinary grain-laden steamer is, during the winter months on the Atlantic, safe without a spar-deck and a main-topsail.

A CONTRIBUTION FROM AN OLD FRIEND.

III.

EARLY get your boys to cultivate an orderly habit, *showing* them the place for everything, and insisting upon their keeping everything in its place. A little extra pains taken at the commencement will do them good and save yourself much future annoyance. Do not keep them all the time cleaning brass work, &c., but trust them early with little bits of rigging and sail work, the spoiling of which cannot do much harm ; they will all the sooner become valuable assistants to you.

See that they keep their persons, clothes, and lodgings clean. It is your *duty* to see that they are taught (in due time) all the details of their profession. Any disinclination to learn on their part will not release you from your moral responsibility. Be strict and firm, while trying to shield them from everything that you now can see was wrong in the treatment you received when an apprentice, and do not expect too much from "boys."

So much could be said about the way to treat men, that I had better do nothing more than reassert the value of setting them a good example. Anger blazing in your eyes will most certainly reflect itself in theirs. Let them see you extravagant, indolent, and dissatisfied, and they will readily *follow* your example.

Be yourself obedient, diligent, active, cheerful, and considerate, and they will approximate towards the same desirable qualities as quickly as their previous education and such short notice will allow. You will meet with many who will try your patience, men upon whom kindness *seems* to make no impression, but even these men may do you good, if you so will it, and assist you to keep a proper control over your temper. You will have to strive hard to avoid altering your conduct because of anything they may do or say—a very difficult task I will allow, but still a very necessary one. Do not ever be tempted to "work up" such men, neither allow one iota of the work that they should perform to devolve

upon the quiet, well-conducted men. A quiet, firm, persistent determination to do your duty must tell upon even these men, who after all are "somebody's bairns," and are never past reclaiming. Avoid using threats and never resort to physical force until required for self-defence, which I can pretty safely promise will never be the case if you acquire the spirit I am striving to inculcate. People are astonished at the apparently light sentences sometimes passed upon seamen for offences against discipline. They do not, perhaps, consider that the officer's conduct has sometimes "led up" to the offence, and has been taken into account by the magistrate. But at sea as on shore, there are men who *must* be punished, and while avoiding frivolous complaints, no serious refusal or neglect of duty should be kept from the captain's knowledge. Misplaced leniency to such men is cruelty to those whom they influence by their example.

It is very important that you get your men into a way of relieving watches quickly; this can only be done by example, and it does not speak well for a chief officer's energy if the captain is worried with the conviction that he cannot depend upon having his motive power "under command" in less than fifteen or twenty minutes, which is now sometimes the case. The watch ought never to be longer than five minutes in mustering, nor take half that time to get on deck in case of emergency.

Visit the look-out frequently. Officers are liable to teach men (by their conduct) that if they are awake that is all that is required of them. It is a fatal mistake, and you cannot too frequently or urgently impress them with the importance of *looking out*.

I was in one of two ships that collided in an unfrequented part of the Western Ocean in 1862. We had not seen a ship for three days previously, and it was a mercy we were spared to see another, for we were fearfully crippled, and had to lash and nail a tarred sail over the hole which the other made. When *she reported herself*, midnight had just struck, but the watch had not been relieved, and the *look-out* man was on the forecastle. The officer of the watch had hove the log, and *gone below to mark the slate*, instead of waiting until he was relieved to do so.

On another occasion, a dark, clear, but windy night, in the

"Chops of the Channel," oaths and curses, loud and deep, in strange voices, first reported to our captain in his cabin the vicinity of a strange ship, and the two swiftly moving masses grazed each other and separated almost before we knew our danger. At this time (7 p.m.) the officer of the watch was vigorously pacing the poop, and *two* men (looking out—spinning yarns) on the forecastle. Never allow any but the look-out man on the forecastle after dark.

We never value our health till we find it leaving us, and the importance of the value of time increases as we find ourselves drawing near the end of it ("what our contempt doth oft hurl from us, we wish it ours again.") Similar thoughtlessness causes us more heedlessly to risk our lives in youth than later in life, and while realising the impossibility of putting old heads on young shoulders, I should like my younger brother to dwell upon the fact, that the lives of those *with them* are always dependent upon their vigilance.

The safety of the ship is of paramount importance, and all that bears upon it should be thoughtfully considered and provided for, therefore the ability as well as inclination of each member of your crew should be studied, for some men are very near-sighted, and would not see a vessel twenty yards off at night. Moonlight, strange as it may appear, is a dangerous time, for a ship's sails coincide so exactly with the moonlight (at some angles), that a vessel may easily be within a quarter of a mile of you without you being the least aware of her proximity. At such times, side-lights are apt to be neglected, and it is well to "sweep the horizon" occasionally with binoculars.

Two vessels left their discharging port for a coal port to load, both being in ballast. An intimate acquaintance of my own commanded one (a brig), myself the other (a barque).

At 5 p.m. on the second day out the brig bore for me, as on the port tack. He stood in for the land, distant about eight miles. We had a brisk contrary wind, and there was not another vessel of any kind to be seen. At 6 p.m. (dark) I put my vessel on the port tack, knowing that at the same time the brig would be put on the starboard tack.

At 7 p.m. we sighted her red light on the lee bow. I knew we

could not weather her, and put my helm up in what I (then) thought ample time; but when I got her in sight on our port bow, I saw the light change from red to green. I remarked to the man at the wheel that the brig had put her helm up, and desiring him to keep ours hard up, I let go our mizen-sheet, and hailed him to keep his luff. She struck us very violently *stem on* amidships on the port-side, doing a very great amount of damage. In time we both got towed to our port; a committee of the club held an inquiry into the accident, and, to my utter astonishment, decided that my vessel was wrong, because both master and mate of the brig asserted that their helm had never been *put up*. In vain did I beg the committee to examine the ships. They said they had to decide by the evidence, and there was the word of the master and mate of the brig *against* my unsupported testimony. For, never dreaming that the facts would have been denied, my own crew (runners) had *all* been allowed to scatter. Looking back now after many long years of experience, I can see that the decision was not in accordance with the real facts of the case. (It was afterwards reversed.) But, though not legally guilty, I now feel myself morally so; for, confident in the knowledge I possessed, and my command over my ship, I held on *too long*—I, in fact, *threatened* the brig—put him in terror of his life. If the master himself had been on deck it would not have happened; but (it afterwards transpired) the mate got terrified, lost his presence of mind, and ordered the helm to be put up. Nothing could justify him in doing that. Neither am I or you justified in threatening to take a man's life—"frightening him out of his wits."

The mate neglected his *duty* in not calling the captain the moment any doubt of the ship's perfect safety entered his mind. No matter how cool and capable an officer may be, he is guilty of *wilful neglect of duty* if he leaves the captain in ignorance of any approach of danger.

It may be out of place here to mention it, but I cannot but think and hope the time will soon arrive, when a chief officer in steamers will be released from the ever-increasing strain upon his powers of endurance, by the appointment of another responsible watch-keeping officer.

A CONTRIBUTION FROM AN OLD FRIE

III.

EARLY get your boys to cultivate an c *showing* them the place for everything. upon their keeping everything in its p extra pains taken at the commencemen good and save yourself much future annoyance. them all the time cleaning brass work, &c., l early with little bits of rigging and sail work, the s cannot do much harm; they will all the sooner assistants to you.

See that they keep their persons, clothes, a It is your *duty* to see that they are taught (in details of their profession. Any disinclination part will not release you from your moral strict and firm, while trying to shield them f you now can see was wrong in the treatment an apprentice, and do not expect too much fr

So much could be said about the way to t better do nothing more than reassert the ve good example. Anger blazing in your eyes reflect itself in theirs. Let ... you c and dissatisfied, and they ... *follow*

Be yourself obedient, ... ve, che and they will approxim ... the sam quickly as their previo ... on and allow. You will meet upon whom kindn these men may do keep a proper c hard to avoid ... but becau or say— ... will allow, one. ... pted to "wr all ... that they

(then)
t bow,
he man
ing him
d him to
dships on
In time we
ub held an
ent, decided
mate of the
. In vain did
aid they had to
the master and
ny. For, never
d, my own crew
ooking back now
e that the decision
the case. (It was
ally guilty, I now feel
knowledge I possessed,
ld on *too long*—I, in fact,
r of his life. If the master
not have happened; but (it
rrified, lost his presence of
up. Nothing could justify
you justified in threatening
n out of his wits."
not calling the captain the
rfect safety entered his mind.
n officer may be, he is guilty
the captain in ignorance of any

mention it, but I cannot but think
arrive, when a chief officer in
he ever-increasing strain upon his
ppointment of another responsible

Do not confuse your mind with any intricate problem of how you can *legally* get into collision, but study how to avoid getting into a position of danger. Your best safeguard is in cultivating perfect self command—better, far better done in your daily routine of duty than in dangerous emergencies—which will enable you to adopt promptly (not hurriedly) the proper course in times of doubt and danger.

I have hitherto practically ignored the commander, feeling assured that you perfectly understand *your* duty to be always subordinate to his.

I have used the terms employer, commander, &c., indiscriminately, for (whoever may engage you) you will do well to regard them as synonymous. There should be no separate interest any more than divided authority in the little world you sail in.

"How, in one house should many people, under two commands, hold amity? 'Tis hard; almost impossible." Had Shakespeare been writing of a *ship*, he would have omitted the word "almost." You must be careful to set an example to your men of prompt and cheerful obedience to *your* superior officer, bearing always in mind how much your future prospect depends upon his report of your character. Do not be impatient of his supervision, it is his *duty* to see that yours is duly performed. The more perfect and truthful your character the less need there will be for him to interfere with your management, and the less you will be inclined to take offence when he does so.

Masters are not "infallible," and you may be placed with one who is unreasonable and cannot appreciate your conscientious desire to do your duty; but if you are consistent in your conduct, he cannot but contrast it with that of other officers, and value your services accordingly. Upon this subject, as with that of your conduct towards your crew, so much could be said that I had better leave you to think it out, only warning you that the master's authority cannot suffer without yours suffering also; therefore, however much you may differ from him as to the wisdom or desirability of any instructions you may have to carry out, never let your men imagine that you do so. Upon the tone in which an order is given depends, in a very great measure, the

manner in which it is carried out, and no officer who in *any way* teaches his men that an order is given on compulsion, can be a desirable character, upon which, more than on the possession of a certificate, depends your success in life.

In the good old times, underwriters and insurance clubs found it necessary, for their own protection, to "pass masters," &c., for the vessels they insured. Their requirements were low; but even these were often evaded, and the lives of those sailing in vessels uninsured, were often entrusted to totally ignorant men. Many ludicrous, but still more tragic, results were the consequence. Jack, at no time credited with much forethought, could not be expected to distinguish between the minimum and maximum of risk to which they were exposed in different vessels, and so to protect them and all who travel by sea came Government supervision (just as with mines, factories, &c.). It was found necessary to fix a standard of requirements, low at the outset, but it is now gradually raised to keep pace with the superior education our young men are receiving. That the standard of excellence is not yet fixed too high is proved by the fact that some of those who have successfully passed the ordeal and nourish the idea that their certificate fairly entitles them to a situation, may be heard lamenting the prospect of there being *no sailors left*. "We'll all be masters and mates, soon," is not an uncommon cry. They cannot yet see that if it were really so, if every man held a certificate enabling him to compete for an officer's situation, the service must needs be better for it, and the most efficient men would, as a rule, struggle to the surface.

The young man who first acquires a correct estimate of the truth in this matter, *and acts upon it*, will have an incalculable advantage over a contemporary who continues to think that a Board of Trade certificate stamps him as possessed of all the qualities necessary to make him an expert and therefore successful seaman. For the one will go on patiently, picking up grain by grain the gold that will make him rich in character, and, if spared, will some day realise the pleasant fact that it would be easier for him to find another employer than to leave his present one. The other, failing to convince his employers that the certificate is a monster nugget,

creating him a very "nabob" in respect of character, is in danger of becoming like men I have known, who for years have been "passed masters," and not having obtained the command they consider themselves entitled to are fast settling into soured, disappointed, discontented men, living feverishly *through* the present (not in it), waiting like Mr. Micawber "for something to turn up." "It is a foolish bird which fouls its own nest." My object is not to vilify the class to which I am proud to belong, but to help you if possible to adorn it; I am well aware that there are many capable and meritorious officers who have long to wait for their promotion. But it is only necessary to sail with others to understand the reasons for their disappointment. To see how easily they square their sense of duty with their love of ease; to see the false pride that pervades their whole character, preventing them from in any way admitting that they can be in error, or that there is anything n their profession left for them to learn, forgetting "that to acknowledge we have made a mistake only proves us to be wiser now than when we made it;" anxious only that those around them should take them at their own valuation, and believe that their employer has the best of the bargain.

These men do not go on board a vessel *to learn;* they do not go *to work;* being perfection themselves they expect it in others, and therefore do not go to *teach;* they are jealous of their dignity (?) and privileges; and while, as a natural consequence of their character, many of their most important duties are neglected, they are always ready to take offence and quarrel with the commander for trying to remedy their neglect. Believing it to be their privilege to remain idle, they do so most conscientiously, and may often be seen *following* their men round like convict warders, the men, of course, assisting to complete the resemblance by working like convicts.

Exercising no forethought, they do not know how to employ their men, though the ship is going to wreck for want of attention. Work that could be done under shelter is selected for fine weather, and more important work aloft neglected; beside the still worse mistake of practically teaching the men that there is nothing for them to do, which they are always ready to believe most religiously.

Thoughtless of all that concerns the ship, except in so much as it ministers to, or interferes with, their self-indulgence, there is no stitch taken in time, but all manner of thoughtless and wasteful expedients are resorted to, to remedy evils that ought to have been prevented. The progress of the ship is impeded by their dilatoriness in trimming and setting sail. But nothing will testify more surely to their thorough selfishness, and the fitness of things that keep these men in a subordinate position, than the fact that they not only allow themselves to be overcome by sleep in their watch on deck, but actually court it; wilfully staking the lives of their shipmates sleeping trustfully below, against the chance of getting their criminal self-indulgence indicted by the commander, leaving to more ignorant (?) and less responsible men the duty they set them the example of neglecting.

It may appear incredible, but I appeal to the reader if he has not known men do this. I have known many spars and sails thus lost, but who can know of the many fatal collisions brought about in this manner by men who have not even the plea of being mis-timed, overworked, or extreme youth, to palliate a neglect of duty so gross that there never can be a valid excuse for it.

The guard, pointsman, or signalman, who is prosecuted for manslaughter, seldom influences others by his pernicious example; but these passed masters practically teach the whole crew to neglect the more important part of a seaman's duty. How can they expect a trustworthy character? When will they learn that if, by chance, they were placed in command to-morrow, they could not retain it because they have neglected to cultivate self-command (subordination), economy, endurance, perseverance, and true moral courage, which is necessary to ensure success.

Thank God such men as these are not numerous, for the evil they do cannot be estimated. Thank God, also, that many, very many, of our successors are earnestly striving to become proficient in their calling. To men whose ideas of duty are not limited by the knowledge their short experience has given them; who will, by their example, do much to counteract the evil caused by selfish men; and who, while striving to avail themselves of all the assistance science is so rapidly providing for them,

will yet recognise the fact that an extra master's certificate, with all possible endorsements, will not enable them to retain command unless accompanied by thrifty, energetic habits, a truthful estimate of duty, and a conscientious desire to make that duty a pleasure; to such I would say, do not be impatient. You may be badly placed, you may see your junior getting command before you, but depend upon it, the time is not lost that is spent in building up a valuable character; and your greater experience will go far in assisting you to make a successful start. Do not make a common mistake and imagine there is no scope for your abilities *where you are*. However faint the impress of your "footsteps on the sands of time," however few there may be to trace them, let them point ever straight in the path of duty, and you will be benefiting yourself and your brother man more as "only mate" of the *Mary Jane*, of Shields, than as chief officer of the finest ocean steamer, if the latter situation should lead you to set an example of selfishness and false pride.

I hope my observations will find some sympathetic readers, who will not see merely an egotistic spirit in what I have written, for greater than my desire to see my letter in print, greater than the garrulous tendency to air my own longer experience, is my desire to help my younger brethren to (*early*) cultivate habits of forethought and industrious energy, the reward of which is certain, and not far distant. No! I am not an owner. I write at sea, and am one of yourselves, although signing myself

A SUNDERLAND (COAL) TAR.

RUSSIAN REGULATIONS RELATIVE TO PRODUCTION OF MANIFESTS OF CARGO.—*Caution to Masters and Owners.*—The Russian Government have determined *strictly* to enforce their Custom House Regulations requiring shipmasters, under a penalty of a fine, to produce manifests for the entire cargo on their arrival in port.

BOOKS RECEIVED.

A Ready Reference for the Use of Shipowners, Overlookers, and Masters. By Robert Bretland, N.A. Philip, Son and Nephew, London and Liverpool.

This is a handy little work for those connected with the building, repairing, or loading of vessels: the co-efficients are easy and accurate, and the calculations based on sound principles. But the work has not been well read for press, which can be amended in another edition. Thus, on page 15, for $\frac{12}{3150}$ read $\frac{3150}{12}$; on p. 18 the multiplier 283 is a decimal, and ·3534 on p. 19 should be 3·534.

Report of the Proceedings of the Second International Meteorological Congress at Rome. 1879. Published by Authority of the Meteorological Council.

Scientific bodies of all kinds now hold congresses to discuss what has been done in the past, and in order that the members may exchange views as to future progress: for both purposes such meetings are especially good. Mr. R. H. Scott, the head of our Meteorological Department, has always attended the International Meteorological Congresses, and given us a good report of the proceedings. The Second Congress was held at Rome in April last; and the most eminent men in Europe and America attended. Reports of high import appear to have been presented to this Congress.

Sunshine and Storm in the East; or, Cruises to Cyprus and Constantinople. By Mrs. Brassey. London: Longmans. 1880.

Mrs. Brassey dedicates her new book "To the brave, true-hearted Sailors of England, of all ranks and services;" but we fear that very, very few of our humble seafaring friends will ever be conscious of the honour done them by Mrs. Brassey, and, if they were, would not value it so much as a glass of grog or a quid of tobacco. However, Mrs. Brassey's genial good-nature, and her love of maritime associations, is expressed by her dedication, and we know that her profession of regard for the British sailor is not

an empty sentiment, but is real and practical. We admire Mrs. Brassey's book and her industry, we are charmed with the beautiful sketches and the light graceful way in which we are led from place to place, and, in effect, made one of the very pleasant party on board the *Sunbeam*. The book is handsomely got up, although we must say M. Gustave Doré's design much needed the explanation in the preface, for, on the face of it, it was incomprehensible.

Having said this much, we cannot but give expression to a latent feeling which strikes in with a somewhat discordant effect. Mrs. Brassey's book is so gorgeous; her narrative of the voyaging so pleasant and interesting; the air of luxurious comfort on board the *Sunbeam* so continually suggested, that we cannot but contrast the sea life so depicted with the actual existence of the average sailor. From the practical view of things which we are bound to take, it seems to us that the dedication to the brave, true-hearted sailors, coming as it were from the comfortable yacht, the rich surroundings, and pleasure-seeking atmosphere of the *Sunbeam* party, suggests a sad contrast, and perhaps would have been better left out, notwithstanding Mr. Brassey's warm-hearted feelings towards sailors.

But, nevertheless, the book will do much good. It is full of expressions of sympathy for those who live on the sea, and demonstrates how a gentleman like Mr. Thomas Brassey can qualify himself to navigate his own vessel successfully in very dangerous waters.

The book is sure to be successful, and deservedly so, but we cannot think our seamen would read it with much interest.

CORRESPONDENCE.

DAVIS'S SUN'S TRUE BEARING OR AZIMUTH TABLES.

To the Editor of the "Nautical Magazine."

Sir,—Allow me to draw your readers' attention to an erratum in my Azimuth Tables, kindly communicated to me by Captain James Gordon, of the s.s. *City of Mecca.*

It is on page 194 under Declination 4°:

	h. m.		° ′		° ′
	X. 0		132.46		129.46
Opposite	IX.56	for	132.41	read	128.41
	IX.52		132.38		127.38

I am, Sir,

Your obedient servant,

PERCY L. H. DAVIS.

2, Fairfield, Charlton, Kent,
November, 1879.

NOTES OF A VOYAGE FROM CHINA TO AUSTRALIA.

To the Editor of the "Nautical Magazine."

Sir,—Having taken in your valuable journal for some years, and deriving a great deal of benefit from information found therein, I would like to contribute some items connected with a voyage from China to Australia, and back to China, which if you think worth you can publish.

We left Hong Kong on the 11th August for Sydney, New South Wales, and passing out into the Pacific Ocean north of Luzon, proceeded south to the west of the Pellew islands, and passing within eight miles of the Sequiras Isles, as marked on Imray's sheet of the Eastern Archipelago, without seeing anything of them from the masthead at sunset, although the weather was clear. The next day, the 18th August, at noon, our latitude was 6° 56′ N., longitude 132° 36′ E. The day very clear, and favourable for seeing a long distance; but from the masthead we could see nothing of the Johannes Isles, which are laid down on the chart about this position. Our chronometers were rated in Hong Kong before we left, and the observations were good.

We had light S.E. 1-3 winds from leaving Hong Kong till we got to 15° S., and from there to Sydney N.E. and Easterly, 3-4 fine weather; not a shower of rain.

Currents from Luzon to 6° N., half a mile an hour to S.W.; 6° N. to 2½° N., one mile an hour to Eastward; 2½° N. to St. John's, one and a half mile an hour to Westward. Little current in the Coral Sea, and strong southerly currents on the coast of Australia. We passed between New Ireland and the Soloman group both going and coming, and had the currents nearly alike both times, and winds also till we got to 10° north, when we had N.E. winds. We passed in sight of Mellish reef, but saw no beacon of any sort on it, so suppose it has been washed away. Squally Island, off the north coast of New Ireland, I found only to be about two miles square, instead of fifteen long and three broad, as it is in the charts I have; it is low, but covered with trees of a good height. Some canoes came off with about 40 men in them, and we saw about 150 more inhabitants on the shore.

We passed within ten miles west of the island of Kumi (Meiaco-Sima Group), and saw no signs of broken water either to N.W. or S.W. of it, as reported and marked on charts; neither did we see anything of the Islet reported as existing in lat. 24° 9′ N., long. 122° 23′ E. We had clear weather and a moderately high sea.

Found the Kuro-Sima current running 1½ knot an hour as we passed Kumi.

I am, dear Sir, yours very truly,

JAMES ROSS, Master.

S.S. *Benledi*, 9th November, 1879,

Foochow.

RAPID STEAM COMMUNICATION WITH AUSTRALIA *viâ* CAPE OF GOOD HOPE.—The s.s. *Orient*, of which we spoke in the December number of the *Nautical Magazine*, has made the passage from Plymouth to Adelaide, calling at St. Vincent and the Cape in 37 days 22 hours; and, including the time of stoppage, in 36 steaming days.

TIDE TABLES FOR JANUARY, 1880.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M.	London Bridge. P.M.	Hull. A.M.	Hull. P.M.	North Shields. A.M.	North Shields. P.M.	Leith. A.M.	Leith. P.M.	Devonport. A.M.	Devonport. P.M.	Dover. A.M.	Dover. P.M.	Weston-Super-Mare. A.M.	Weston-Super-Mare. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
Th	1	4 4	4 21	8 36	8 54	5 29	5 48	4 24	4 43	7 38	7 56	1 8	1 27	8 57	9 14
F	2	4 40	4 58	9 13	9 32	6 8	6 28	5 2	5 22	8 14	8 33	1 47	2 7	9 31	9 48
S	3	5 16	5 36	9 52	10 12	6 49	7 10	5 44	6 6	8 52	9 11	2 27	2 47	10 5	10 22
S	4	5 56	6 19	10 34	10 58	7 32	7 56	6 29	6 52	9 30	9 53	3 8	3 29	10 40	10 59
M	5	6 41	7 5	11 25	11 54	8 23	8 52	7 17	7 46	10 17	10 43	3 52	4 15	11 20	11 45
Tu	6	7 32	7 59	—	0 26	9 23	9 58	8 17	8 50	11 11	11 45	4 39	5 6	—	0 15
W	7	8 30	9 6	0 59	1 33	10 31	11 12	9 27	10 6	—	0 22	5 36	6 10	0 49	1 27
Th	8	9 47	10 26	2 8	2 41	11 50	—	10 43	11 19	1 1	1 41	6 47	7 28	2 7	2 49
F	9	11 5	11 44	3 21	3 58	0 26	1 1	11 54	—	2 21	3 0	8 8	8 44	3 33	4 15
S	10	—	0 20	4 32	5 3	1 33	2 2	0 27	0 56	3 39	4 12	9 17	9 48	4 53	5 27
S	11	0 51	1 20	5 31	5 58	2 29	2 55	1 24	1 51	4 43	5 11	10 17	10 46	5 59	6 29
M	12	1 48	2 14	6 25	6 50	3 19	3 43	2 17	2 41	5 38	6 5	11 13	11 39	6 56	7 20
Tu	13	2 38	3 0	7 14	7 38	4 6	4 29	3 3	3 25	6 30	6 53	—	0 5	7 43	8 6
W	14	3 24	3 47	8 1	8 22	4 52	5 14	3 47	4 9	7 13	7 33	0 29	0 52	8 27	8 46
Th	15	4 8	4 28	8 42	9 2	5 35	5 56	4 30	4 51	7 53	8 12	1 14	1 36	9 5	9 23
F	16	4 48	5 7	9 22	9 42	6 17	6 37	5 11	5 31	8 30	8 47	1 57	2 18	9 41	9 58
S	17	5 25	5 43	10 1	10 19	6 57	7 17	5 51	6 12	9 3	9 19	2 38	2 56	10 13	10 27
S	18	6 2	6 23	10 39	11 0	7 37	7 59	6 33	6 54	9 35	9 53	3 14	3 32	10 42	10 57
M	19	6 42	7 2	11 23	11 49	8 21	8 40	7 16	7 40	10 11	10 31	3 50	4 10	11 15	11 37
Tu	20	7 24	7 50	—	0 18	9 14	9 47	8 8	8 39	10 56	11 22	4 31	4 55	—	0 4
W	21	8 18	8 49	0 49	1 21	10 20	10 58	9 14	9 52	11 53	—	5 24	5 57	0 35	1 11
Th	22	9 29	10 13	1 55	2 31	11 36	—	10 30	11 7	0 30	1 8	6 33	7 13	1 52	2 33
F	23	10 52	11 31	3 7	3 44	0 14	0 50	11 43	—	1 47	2 25	7 52	8 29	3 13	3 53
S	24	—	0 7	4 18	4 47	1 21	1 48	0 16	0 43	3 2	3 37	9 0	9 25	4 29	4 59
S	25	0 37	1 2	5 12	5 32	2 11	2 33	1 5	1 26	4 7	4 33	9 49	10 11	5 27	5 51
M	26	1 25	1 44	5 51	6 10	2 51	3 9	1 47	2 6	4 57	5 18	10 31	10 51	6 13	6 35
Tu	27	2 4	2 22	6 29	6 48	3 26	3 43	2 24	2 42	5 37	5 56	11 11	11 31	6 55	7 14
W	28	2 38	2 56	7 7	7 26	4 0	4 17	2 59	3 15	6 15	6 34	11 51	—	7 32	7 50
Th	29	3 12	3 28	7 41	8 1	4 34	4 52	3 31	3 47	6 53	7 11	0 10	0 28	8 7	8 23
F	30	3 46	4 3	8 18	8 35	5 10	5 28	4 4	4 22	7 26	7 43	0 47	1 6	8 39	8 56
S	31	4 22	4 38	8 52	9 9	5 46	6 4	4 40	4 58	8 1	8 19	1 25	1 44	9 13	9 30

Week Day.	Month Day.	Liverpool. A.M.	Liverpool. P.M.	Greenock. A.M.	Greenock. P.M.	Queenstown A.M.	Queenstown P.M.	Kingstown. A.M.	Kingstown. P.M.	Londonderry. A.M.	Londonderry. P.M.	Brest. A.M.	Brest. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
Th	1	1 8	1 26	1 57	2 15	7 8	7 26	0 59	1 18	9 58	10 16	5 49	6 7
F	2	1 44	2 2	2 34	2 53	7 45	8 4	1 37	1 57	10 35	10 56	6 26	6 46
S	3	2 21	2 41	3 12	3 31	8 23	8 42	2 18	2 39	11 20	11 46	7 6	7 28
S	4	3 2	3 24	3 51	4 12	9 1	9 22	3 1	3 24	—	0 14	7 50	8 18
M	5	3 47	4 12	4 35	4 59	9 45	10 10	3 48	4 16	0 46	1 20	8 37	9 4
Tu	6	4 41	5 14	5 25	5 55	10 39	11 14	4 46	5 19	1 56	2 34	9 35	10 11
W	7	5 53	6 35	6 30	7 7	11 53	—	5 53	6 28	3 12	3 47	10 51	11 33
Th	8	7 16	7 55	7 46	8 26	0 32	1 13	7 4	7 40	4 20	4 50	—	0 15
F	9	8 32	9 6	9 6	9 43	1 56	2 34	8 18	8 54	5 19	5 48	0 54	1 29
S	10	9 36	10 5	10 15	10 45	3 8	3 39	9 28	9 58	6 16	6 44	2 0	2 29
S	11	10 32	10 57	11 14	11 42	4 8	4 36	10 24	10 48	7 12	7 39	2 56	3 22
M	12	11 22	11 46	—	0 9	5 2	5 27	11 11	11 34	8 4	8 26	3 46	4 10
Tu	13	—	0 9	0 34	0 58	5 51	6 14	11 57	—	8 47	9 8	4 33	4 56
W	14	0 32	0 59	1 21	1 43	6 35	6 56	0 20	0 42	9 28	9 47	5 17	5 37
Th	15	1 14	1 34	2 3	2 23	7 16	7 36	1 4	1 27	10 6	10 25	5 57	6 16
F	16	1 54	2 13	2 43	3 2	7 55	8 14	1 46	2 6	10 45	11 5	6 35	6 54
S	17	2 32	2 50	3 20	3 37	8 31	8 48	2 26	2 46	11 26	11 50	7 13	7 32
S	18	3 8	3 26	3 55	4 14	9 5	9 22	3 6	3 26	—	0 16	7 52	8 12
M	19	3 46	4 8	4 33	4 53	9 40	10 2	3 46	4 10	0 44	1 14	8 32	8 56
Tu	20	4 33	5 2	5 17	5 41	10 29	11 1	4 38	5 8	1 46	2 21	9 24	9 57
W	21	5 37	6 18	6 16	6 52	11 38	—	5 40	6 15	2 58	3 34	10 35	11 17
Th	22	7 0	7 41	7 32	8 12	0 18	0 58	6 51	7 28	4 9	4 42	—	noon
F	23	8 19	8 52	8 51	9 26	1 37	2 15	8 4	8 39	5 13	5 40	0 39	1 14
S	24	9 22	9 45	9 57	10 22	2 49	3 16	9 10	9 36	6 3	6 25	1 44	2 9
S	25	10 6	10 25	10 46	11 8	3 40	4 2	10 0	10 20	6 46	7 7	2 31	2 51
M	26	10 44	11 3	11 29	11 49	4 22	4 42	10 37	10 54	7 27	7 46	3 10	3 28
Tu	27	11 21	11 39	—	0 9	5 1	5 20	11 11	11 28	8 5	8 22	3 46	4 4
W	28	11 57	—	0 28	0 46	5 38	5 56	11 45	—	8 38	8 53	4 22	4 39
Th	29	0 15	0 33	1 4	1 22	6 13	6 30	0 2	0 20	9 8	9 24	4 56	5 13
F	30	0 50	1 7	1 39	1 56	6 48	7 6	0 38	0 56	9 40	9 57	5 30	5 47
S	31	1 24	1 42	2 13	2 31	7 24	7 42	1 14	1 33	10 14	10 32	6 4	6 23

TIDAL CONSTANTS

FOR VARIOUS BRITISH, IRISH, AND EUROPEAN PORTS.

By applying the Tidal Constant of the place, according to its sign (+ *add* − *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

PLACE.	CONSTANT. H. M.	PORT OF REFERENCE.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 3	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 8	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 3	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Helgoland	+0 21	Dover
Holyhead	−1 12	Liverpool
Holy Island harbour	−0 53	N. Shields
Honfleur	+5 42	Brest
Inverness	−1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mar
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mar
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mar
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 13	Dover
Padstow	−1 41	Weston-s.-Ma
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Ma
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Ma
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Ma
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Ma
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 43	London
Youghall	+0 13	Queenstown

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London, W.C., and 6, Lord Street, Liverpool.

ENGLISH (APPLICATIONS.)

4640. Gaspare Minisini, Turin, Italy. "Improvements in the means of obtaining motive-power from the motion of ships or waves, and in the application of such motive-power for pumping, part of which improvements may be applied for the construction of pumps generally." (A communication.)

4708. James White, Glasgow. "Improvements in, and connected with, electric bells, specially designed for signalling from the rooms of passenger ships, and hotels, and for other like purposes."

4710. William Sayer, Derby. "A new or improved pressure and vacuum apparatus for starting, steering, stopping, and reversing torpedo and other boats."

4733. George Wilson, Westminster. "An improved method and apparatus for the purpose of propelling vessels, and also for other purposes."

4845. George F. Lyster, Liverpool. "Improvements in appliances for facilitating the discharge of grain and bulk cargo from ships."

4878. John Louis Lay, Paris, France. "Improvements in torpedo boats, and in apparatus to facilitate the working of the same." (A communication.)

4921. James Donaldson, Birkenhead. "Improvements in the construction of, and method of propelling, high speed torpedo and other small boats."

4958. Moska Marichenski, Poplar, Middlesex. "Improvements in apparatus for propelling boats."

5053. Milton Stuart, Antwerp, Belgium. "Improved mode of shipping palm oil and other oils and greases of somewhat similar consistence, and improvements in, and appertaining to, receptacles for the same." (A communication.)

AMERICAN.

221412. Robert G. Jones, Pittsburg, Va. "The construction of barges, boats, &c."

221538. Frederick J. Dennis, Chicago. "Marine signal-lamps."

BELGIAN.

49605. P. A. Greil. "A universal joint for a propeller-rudder."

49690. T. B. Heathorn. "Improvements in apparatus for steering ships, vessels, boats, and torpedoes, and for checking their speed."

FRENCH.

131051. Richard Moulnis. "An oar for steering boats."

131348. Watson. "An apparatus or machine for steering vessels."

131398. Barker. "Signals and signal apparatus for vessels in the open sea or at night."

GERMAN.

8392. G. Baumgarten, Forsthaus Grüna, near Chemnitz. "A propeller for vessels and balloons."

8411. A. Heel, Bielefeld. "An apparatus for propelling vessels by the suction and expulsion of a column of water."

8484. S. Duer, Westminster. "A hydraulic lift for river and canal boats."

INDIAN (BRITISH).

5. C. Fouracres, Deluee, on Sone, Shahabad, Bengal. "Dredging canals, docks, harbours, rivers, tanks, reservoirs, &c., for sinking wells, caissons, and foundations of all kinds; for lifting and discharging grain or other cargo in bulk from ships and boats, &c., &c., called 'Fouracres' automatic dredger.'"

VICTORIA.

2696. Henry Bell, James Bell, and Joseph James Colman, Glasgow, Scotland. "Improvements in processes and apparatus or arrangements for cooling and regulating the temperature and dryness of air in holds, saloons, and cabins of ships, in railway vehicles, hotels, theatres, halls, factories, hospitals, slaughter-houses, and other interiors."

Patents Published.

INDICATING LAMPS.

1570. 21st April, 1879. Price 2d. John Harris, Wellclose Square, Middlesex (not proceeded with).—The object of this invention is to indicate the movements of a vessel's rudder. A lamp is placed in a conspicuous position adapted to give a light all round; this lamp is surrounded by two concentric cylinders of glass, one green, the other red; these glasses are mounted upon rods arranged alongside, and are by them raised or lowered so as to surround the lamp, the rods being coupled together so that as one glass ascends the other descends; they are also connected by interposed mechanism with the steering wheel. When the rudder is amidships the lamp appears without any interposed screen, and the cylindrical glasses are both hidden within a casing below the lamp. The movement of the helm from the midship position causes one or other of the glasses gradually to rise to view, and by the light of the lamp gives the indication required.

MARINE STEAM ENGINES.

1649. 26th April, 1879. Price 6d. George Hill, Westoe, South Shields, Durham.—This invention has for its object to facilitate the use of fresh or distilled water in place of salt water for the working of steam engines used for propelling vessels, and at the same time to do away with the necessity of having openings through the sides of the vessel for drawing in and discharging the water for the working of the engine. For this purpose condensing chambers are placed on the exterior of the vessel; the exhaust steam from the cylinders of the engine is led by pipes to these condensing chambers and is condensed in them; the condensed water is allowed to flow from these chambers to a closed reservoir and is admitted to the boiler again by means of a closed supply vessel connected to both reservoir and boiler. A vacuum having been created therein by means of steam the water is admitted and thence it flows into the boiler.

MARINE CLOCKS.

1686. April 29, 1879. Price 4d. Henry Horatio Ham, Jun., Watchmaker, and Elbridge Gerry Pierce, Jun., Merchant, both of

Portsmouth, New Hampshire, U.S.A. (A communication.) (Complete specification.) The object of this invention is to improve that class of marine clocks usually called ships' watch clocks, causing them to strike the bells indicating the hours and half-hours of each watch with pauses between the blows in the same manner as when struck by hand, these clocks having hitherto struck the bells or indicated them in their order without denoting the pauses as given by a seaman while striking the ship's bell. This is mainly accomplished by fixing to the side of the main striking wheel a series of studs so spaced as to give the necessary pauses after each blow or series of blows; upon the shaft of this wheel and revolving with it once every four hours is a circular lock plate provided with notches on its circumference into which the stop lever engages as in the usual manner.

STEAM STEERING APPARATUS.

1899. May 13, 1879. Price 6d. George Donkin and Bryan Gray Nichol, St. Andrew's Ironworks, Newcastle-upon-Tyne.—This invention consists in the application to an ordinary steering apparatus, having fitted to it a steam engine and a steam supply and regulating valve, of an arrangement of level or mitre wheels and screws for actuating the regulating valve, by means of which steam is more conveniently admitted to, and automatically shut off from, the engines; and, in conjunction with the above, an arrangement of a spur-pinion and clutches, or friction-cones and sleeves, on the hand-wheel shaft, to allow the steam supply and regulating valve gear to be actuated by the ordinary hand-wheel and shaft in such manner that the steam may, by the movement of the hand-wheel and shaft, operate through the engine upon the rudder in the same direction, and more or less in the same degree as if the hand-wheel were operating on the rudder in the usual manner by hand.

ADDITIONAL RULES AS TO INVESTIGATIONS INTO SHIPPING CASUALTIES.

THE MERCHANT SHIPPING ACT, 1876, 39 & 40 VICT., CAP. 80.
THE SHIPPING CASUALTIES INVESTIGATIONS ACT, 1879, 42 & 43 VICT., CAP. 72.

Whereas, by section 30 of the Merchant Shipping Act, 1876 (39 & 40 *Vict.*, *c.* 80), it was provided as follows :—

"The Wreck Commissioner, Justices or other authority holding a formal investigation into a Shipping Casualty shall hold the same with the assistance of an Assessor or Assessors of nautical engineering or other special skill or knowledge, to be appointed by the Commissioners, Justices or authority out of a list of persons for the time being approved for the purpose by a Secretary of State."

"The Commissioner, Justices or authority, when of opinion that the investigation is likely to involve the cancellation or suspension of the Certificate of a Master or Mate, shall, where practicable, appoint a person having experience in the Merchant Service to be one of the Assessors."

And whereas, by section 3, sub-section 1 of the Shipping Casualties Investigations Act, 1879 (42 & 43 *Vict.*, *c.* 72), it was thus enacted :—

3. (1.) The list of persons approved as Assessors for the purpose of formal investigations into Shipping Casualties shall be in force for three years only, but persons entered in any such list may be approved for any subsequent list. The list of those persons in force, at the passing of this Act, shall continue in force until the end of the year One thousand eight hundred and eighty, but nothing in this section shall affect the power of the Secretary of State to withdraw his approval of any name on any such list or to approve of any additional name.

And whereas the Secretary of State has directed that the Assessors shall, so far as in his opinion circumstances permit, be

taken in order of rotation within each class or sub-class, and has further directed that the Assessors placed by him on the list of Assessors, on and after the 31st of March next, shall be classified according to their qualifications, as follows :—

QUALIFICATIONS.

Class I. *Mercantile Marine Masters.*—(*a*) Five years' service as a Master in the Merchant Service, of which two years must have been service in command of a sailing ship, with a Certificate of Competency.

(*b*) Five years' service as a Master in the Merchant Service, of which two years must have been service in command of a steamship, with a Certificate of Competency.

Class II. *Mercantile Marine Engineers.*—Five years' service as an Engineer in the Merchant Service, with a first-class Certificate of Competency.

Class III. *Royal Navy.*—Rank of Admiral or Captain and three years' service in command of one of Her Majesty's ships at sea, or rank of Staff Commander and three years' service in that rank in one of Her Majesty's ships at sea.

Class IV. *Persons of Nautical Engineering or other special skill or knowledge.*—(*a*) Such qualification as is in the opinion of the Secretary of State requisite for ordinary cases.

(*b*) Such qualification as is in the opinion of the Secretary of State requisite for special cases.

And whereas it was further provided by section 3, sub-sections 2 and 3 of the same Act, as follows :—

(2.) The Assessor or Assessors for each such investigation shall, instead of being appointed by the Commissioner, Justices or other authority holding the investigation, be appointed in such manner and according to such regulations as may be from time to time prescribed by general rules made under section 30 of The Merchant Shipping Act, 1876. (42 *&* 43 *Vict.*, *c.* 72, *s.* 3 (2, 3.)

(3.) Where any such investigation involves, or appears likely to involve, any question as to the cancelling or suspension of the Certificate of a Master, Mate, or Engineer,

it shall be held with the assistance of not less than two Assessors having experience in the Merchant Service. (39 & 40 *Vict.*, *c.* 80.)

Now under the authority of the above-mentioned Acts, I, The Right Honourable Hugh MacCalmont, Earl Cairns, Lord High Chancellor of Great Britain, hereby make the following General Rules:—

Short Title.

1. These Rules may be cited as "The Shipping Casualties Rules, 1879."

Commencement.

2. These Rules shall, subject as hereinafter mentioned, come into operation on the 24th day of December, 1879.

Publication of Rules.

3. These Rules shall be published by Her Majesty's Stationery Office through its agents, and a copy shall be kept at every Custom House and Mercantile Marine Office in the United Kingdom, and any person desiring to peruse them there shall be entitled to do so.

Appointment of Assessors.

4. The power of appointing Assessors for investigations into Shipping Casualties shall be vested in the Secretary of State.

5. If any investigation involves, or appears likely to involve, the cancelling or suspension of the Certificate of a Master, Mate or Engineer, then, in order to satisfy the aforesaid statutory requirement of not less than two Assessors having experience in the Merchant Service there shall be appointed from the list not less than two Assessors from Class I. and Class II., or from either of those classes.

6. Subject to any special appointment or appointments which the Secretary of State may think it expedient to make in any case where special circumstances appear to him to require a departure from these Rules (the requirements of the Rule 5 being always complied with), Assessors shall be appointed as follows:—

(1.) Where the investigation involves, or appears likely to involve, the cancelling or suspension of the Certificate of a Master or Mate, but not of an Engineer, at least two Assessors shall be appointed from Class I.

(2.) Where the investigation involves, or appears likely to involve, the cancelling or suspension of the Certificate of a Master or Mate of a sailing ship one at least of the Assessors shall be appointed from sub-section (*a*) of Class I., and where the investigation involves, or appears likely to involve, the cancelling or suspension of the Certificate of a Master or Mate of a steamship one at least of the Assessors shall be appointed from sub-section (*b*) of Class I.

(3.) Where the investigation involves, or appears likely to involve, the cancelling or suspension of the Certificate of an Engineer one at least of the Assessors shall be appointed from Class II.

7. The Board of Trade shall inform the Secretary of State when Assessors are required, and shall state from which of the aforesaid classes Assessors ought, in their opinion, to be appointed, in order to give due effect to the aforesaid classification and these Rules: but the Board of Trade shall not request the appointment of any individual Assessor.

8. An appointment made by the Secretary of State of any Assessor or Assessors for an investigation shall not be open to question on the ground that it was not in accordance with these Rules, or does not give full effect to the requirements of these Rules.

9. Whereas it is necessary to make temporary provision for the appointment of Assessors until the classification referred to in these Rules can be effected. Therefore, Rules 5 to 7 (both inclusive) shall not come into operation until the 31st of March, 1880, and until those Rules come into operation the statutory requirements as to the appointment in certain cases of two Assessors having experience in the Merchant Service shall be deemed to be complied with by the appointment of persons who, in the existing list, appear as qualified by service in the Mercantile Navy.

Dated this 20th day of December, 1879.

CAIRNS, *C.*

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
1	England — Thames Entrance — North Foreland	Alteration of light.
2	„ „ East Oaze	A gas buoy.
3	„ South Coast—Plymouth	Alterations of breakwater light.
4	„ West Coast—River Severn	New lights.
5	Scotland—East Coast—Peterhead	South harbour closed; light discontinued.
6	„ West Coast—River Clyde	Light discontinued in Gourock bay.
7	Ireland—N.E. Coast—Hunter Rock	Proposed change of buoyage.
8	„ West Coast—Arran Islands	Proposed change of colour of light towers.
9	North Sea—Ems River—Borkum Island	New lighthouse built, and light established.
10	„ „ Borkum Flat Lightship	Syren fog-signal established.
11	France—North Coast—Portrieux	Alteration in position of light.
12	Spain—North Coast—Cape Higuera	Light re-established in old ruin.
13	Mediterranean—France—Gulf of Foz—Bouc Fort	Alteration in sector of light to cover shoal.
14	„ „	Information respecting currents.
15	„ Grecian Archipelago—Syra	Two lights instead of one in harbour.
16	Eastern Archipelago — Philippines — Manila Bay	New light on St. Nicholas banks.
17	Australia—East Coast—Trinity Bay	Reported reef.
18	New Zealand — North Island — Wanganui River	Alteration of signals.
19	„ Middle Island—Akaroa Head	Proposed new light.
20	„ „ Cape Saunders	Proposed new light.
21	„ „ Hokitika	New harbour light.
22	United States — Pacific Coast — Puget Sound	New light at Point-no-Point.
23	South America—Chilé—Mocha Island	Reported danger to South-eastward.
24	„ „ North Chaneral Bay	Rocks near Bryson Point.
25	United States—Florida—Amelia Island	Beacon light discontinued.
26	„ Georgia—Tybee Island Knoll	Lightship discontinued.
27	„ North Carolina—Cape Fear, &c.	Re-establishment of lights, &c.
28	„ Maryland—Jane Island	New light and fog-bell.
29	„ New York—Long Island Sound—Execution Rocks	Alteration of fog-signal.
30	„ Long Island Sound—Stratford Shoal	Change in character of light.
31	„ Rhode Island—Sakonnet Point	Extension of Schuyler ledge.
32	„ Maine—Penobscot Bay	Fog-bell near Owl Head.
33	Canada—Gut of Canso—Havre Bouche	New leading lights.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

1.—England.—*Entrance to the Thames.—Alteration in the Character of the Light at the North Foreland.*—During the month of May, 1880, the light at the North Foreland will be made *occulting.* At and after that time, the light will, once *in every half-minute, suddenly disappear for five seconds, and then as suddenly reappear* at full power. Further notice will be issued.

2.—England.—*Entance to the River Thames.—Gas Buoy at East Oaze.*—Early in the month of January, 1880, the present East Oaze Buoy will be replaced by a *buoy lighted by gas.* Mariners are cautioned to be particularly careful to avoid colliding with the said buoy, as by sudden contact the light may be extinguished.

3.—England.—*South Coast—Alteration in the Colours and Character of the Light on Plymouth Breakwater.*—During the month of May, 1880, the colours of the light on the Plymouth Breakwater will be changed from red to *white towards the sea*, and from white to *red towards the anchorage.* At and after that time the light will show *white* from E. by S. $\frac{1}{4}$ S. round south and west to N.E. $\frac{1}{4}$ E. from the lighthouse, on a line with the Melampus buoy, and *red* within the anchorage. Also, the character of the light will be changed from fixed to *occulting*, whereby the light will, *once in every half-minute suddenly disappear for three seconds, and as suddenly reappear* at full power. Further notice will be issued.

4.—England—*West Coast.—River Severn.*—The Trinity House, London, has sanctioned the establishment of the following lights near Sharpness docks, and at Severn Bridge, River Severn:—

(1.) *Sharpness Docks.*—A *fixed white* tidal light on the north pier head of the tidal basin entrance, to be exhibited when the state of the tide renders it necessary to guard against passing vessels striking the pier. Also a *fixed red* light on the high land north-eastward of the pier, to be shown only when specially required.

(2.) *Severn Bridge.*—A *fixed red* light on the centre pier between the two wide arches, and a *white* light at the landward extremity of each wide arch, to be shown on each side of the bridge.

5.—Scotland.—*East Coast.—Peterhead—Discontinuance of South Harbour Light and Closing of South Harbour.*—Closed to shipping, pending harbour improvements.

6.—Scotland.—*West Coast.—River Clyde.—Discontinuance of Light in Gourock Bay.*—The floating swimming bath has been removed and the *fixed white* light marking it is discontinued.

7.—Ireland.—*North-east Coast.—Antrim.—Hunter Rock, near Entrance to Lough Larne.—Proposed Change of Buoyage.*—As soon as possible after April 1st, 1880, it is intended to replace the present wreck buoy, 40 fathoms N. by E. of Hunter rock, by a first class conical buoy, with a staff and cage, painted black, and marked "North Hunter Rock." At the same time the present first class can buoy, 40 fathoms S. by W. of Hunter Rock, will be replaced by a first class conical buoy, painted black, and marked "South Hunter Rock."

8.—Ireland.—*West Coast.—Galway Bay.—Aran Islands.*—As soon as possible after April 1st, 1880, it is intended to *alter the colour* of the lighthouse towers of the Aran Islands. That on Aran Island, north (or Eeragh Island), will be painted white, with two red horizontal belts on shaft of tower. That on Aran Island, south (or Inisheer Island), will be painted white, with one broad red belt, 28 feet in width, on shaft of tower.

9.—North Sea.—*Ems River.—Light on Borkum Island.*—The new lighthouse is completed, and on 15th November, 1879, the light would be exhibited. It is a *fixed and flashing* light, showing a flash *every two minutes*, preceded and followed by an eclipse; elevated 207 feet above high water, and visible from a distance of 21 miles. At the distance of from 14 to 16 miles a faint continuous light is seen. Position, lat. 53° 35′ 25″ N., long. 6° 39′ 45″ E.

Note.—The old lighthouse kept in line with the new lighthouse leads through a straight channel of 4 fathoms at low water.

10.—North Sea.—*Ems River.—Borkum Flat Light-Vessel, Alteration in Fog-Signal.*—A fog-horn (syren) has been established, which during thick and foggy weather will give a blast of *five seconds'* duration *every minute.*

11.—France.—*North Coast.—Portrieux Light.—Alteration in*

Position.—With reference to previous notice, the permanent light (*fixed red* and visible 7 miles) is now re-exhibited from the new pier head; and the provisional light is discontinued.

12.—SPAIN.—*North Coast.—Light on Cape Higuera.*—With reference to previous notice respecting the temporary exhibition of a light from the ruin of the old lighthouse on cape Higuera, west point of Fuenterrabia bay, a *fixed white* light is now exhibited on the ruin, visible from a distance of about 10 miles. This light will be shown from 1st November to 30th April, and is specially intended to serve as a guide for the fishermen of Fuenterrabia.

13.—MEDITERRANEAN.—*France.—Gulf of Foz.—Bouc Fort Light.—Alteration in Sector.*—In consequence of the extension of shoal ground south-eastward of the entrance to the river Rhone, the following alteration has been made in the outer limit of the sector of red light shown from Bouc fort, eastern side of gulf of Foz. The sector has been extended seaward 6½°, so that it is now visible through an arc of 46½°, or from St. Louis canal entrance on one side, to the bearing N.E. ¾ E. on the other.

14.—MEDITERRANEAN.—*France.—Currents.*—The current on the coast of Provence generally runs to the westward, following the contour of the land; thus it sets to the south-west from cape Mele to Antibes; and thence westerly to Marseille, running at times amongst Hyères islands with great strength. The British steamship *Chiltern*, in August last, when laying the sub-marine cable between Antibes and St. Florent, Corsica, experienced the current setting to the W.S.W. at the rate of 1½ to 2 knots an hour. And it is stated on the authority of the captain of the port of Antibes that during the months of June, July, and August—the period during which the melted snow of the Alps discharges itself into the Mediterranean—this south-westerly set has been felt 40 or 50 miles off the land. Mariners are cautioned accordingly.

15.—MEDITERRANEAN.—*Grecian Archipelago.—Syra Island.—Syra Harbour, Two Lights on Mole Head.*—Instead of one light as previously, there are now two *fixed red* lights, placed vertically, elevated respectively 34 and 31 feet above the sea.

16.—EASTERN ARCHIPELAGO.—*Philippines.—Luzon Island.—Manila Bay, Light on St. Nicholas Banks.*—A lighthouse has been

erected on the north-western shoal head of St. Nicholas banks, south-eastern side of Manila bay. It shows a *fixed green* light elevated 43 feet above high water, and visible from a distance of 8 miles. The light-tower, constructed of iron and cylindrical in shape, rises from the centre of an octagonal building placed on piles in 13 feet water—the structure is painted a grayish white, with bands of dark gray. Position approximate, lat. 14° 26′ 50″ N., long. 120° 45′ 20″ E.

17.—AUSTRALIA.—*East Coast.—Reported Reef in Trinity Bay.*—This reef is reported by the master of the steam-vessel *Wentworth* to consist of coral, to be of small extent, just awash at very low spring tides, with a depth of 8 fathoms close-to; and to lie with the following bearings, viz.:—Low island lighthouse, North, Ely.; Island point, W. by N. ¼ N.

18.—NEW ZEALAND. — *North Island. — South-West Coast. — Wanganui River, Alterations in Local Signals.*—On 1st October, 1879, the following alterations in the local signals authorised to be used at Wanganui river entrance came into operation:—Two moveable beacons (inner the higher) have been erected on North head from which are shown, when the tide serves and the bar is safe, red flags by day and *red* lights at night—these now serve for crossing the bar, instead of the beacon and signal mast as heretofore. Crossing the bar during the day, these two beacons should be kept in line; particular attention also being paid to the semaphore arm, on account of the curves in the channel within the bar. Crossing the bar at night, the two red lights of the beacons should be kept in line; particular attention being paid to the green light, which will be used like the semaphore arm, for guiding vessels inside the bar. This green light travels on a yard on the outer beacon, and vessels must be steered in the direction in which the light is moved.

Note.—Vessels arriving off Wanganui bar at night, should burn flash or blue lights to make their positions known to the look-out at the pilot station, who will answer the signal with a torch or flare light. Sailing vessels should not attempt to cross the bar at night, as then the wind generally dies away or draws off the land. *Variation, 6¼° E.*

19.—NEW ZEALAND.—*Middle Island.—East Coast.—Banks Peninsula.—Akaroa Harbour.—Intended Light on Akaroa Head.*—The lighthouse is in course of erection, and it is anticipated the light will be ready for exhibition early in the year 1880. It will be a *flashing white* light, showing a flash every *ten seconds*. Position, approximate, lat. 43° 54′ 0″ S., long. 173° 0″ 20″ E.

20.—NEW ZEALAND.—*Middle Island.—South-East Coast.—Intended Light on Cape Saunders.*—The lighthouse is in course of erection, and it is anticipated the light will be ready for exhibition early in 1880. It will be a *revolving white* light, obtaining its greatest brilliancy *every minute.* Position, approximate, lat. 45° 53′ 15″ S., long. 170° 45′ 40″ E.

21.—NEW ZEALAND.—*Middle Island.—West Coast.—Light at Hokitika.*—This is a harbour light. It is a *fixed white* light, elevated 122 feet above the sea, and visible from a distance of 16 miles. The lighthouse, 18 feet high, constructed of wood and painted white, is situated on Gaol hill, 1 1/7th miles northward of the flagstaff at Hokitika river entrance. Position, approximate, lat. 42° 42′ 20″ S., long. 170° 59′ 30″ E. On the exhibition of this light, the fixed white light previously shown from the flagstaff, would be discontinued.

22.—UNITED STATES.—*Pacific Coast.—Washington Territory.—New Light at Point-no-Point, Puget Sound.*—On and after Jan. 1, 1880, a *fixed white* light, lighting 270° of the horizon, will be shown from a tower recently erected on this point; elevation, 20 feet above the ground, and 27 feet above the mean sea level. The tower is painted white, the lantern and dome red. The keeper's dwelling, one-and-a-half story wooden building, painted white, stands 200 feet west of the tower. Approximate position, lat. 47° 54′ 41″ N., long. 122° 31′ 6″ W. Bearings and distances of prominent objects are as follows:—Admiralty head-light, N.W., 16 miles; Skatchet head, N.E. by E. ¾ E., 4 miles; West point, S.E. ¾ S., 15½ miles.

23.—SOUTH AMERICA.—*Chilé.—Reported Danger South-Eastward of Mocha Island.*—Information through Captain Maclear, H.M. surveying vessel *Alert*, respecting a sunken danger S.S.E. of negadiza point, southern extreme of Mocha island:—This reported

danger *(Illimani reef)*, on which the Pacific Steam Navigation Company's vessel *Illimani* was said to have been totally wrecked (after striking at about 2h. 30m. a.m. of 18th July, 1879, on her passage from Magellan strait to Valparaiso), has a depth of about 9 fathoms at a distance of 3 cables eastward of it, and is stated to lie with the following bearings and distances, viz: — Anegadiza point, N.N.W., distant $2\frac{8}{10}$ths miles; Sunken danger westward of Illimani reef, W. by S. ¼ S., distant $1\frac{7}{10}$ths mile.

Caution.—Mariners navigating in the vicinity of Mocha island, are warned that a strong north-easterly set may be experienced, for which (especially at night, or in thick weather) due allowance should be made. *Variation*, 17¾° *E.*

24.—SOUTH AMERICA.—*West Coast—Chilé.—North Chaneral Bay—Rocks near Bryson Point.*—Information relative to two sunken rocks lying north-westward of Bryson (Barquita) point, south side of north Chaneral bay:—These rocks, on the outer of which the Pacific Steam Navigation Company's vessel *Colombia* is stated to have touched when entering this bay on 21st August, 1879, are reported on the authority of Mr. G. J. Sheriff, of Chaneral, to lie in a N.W. by W. ½ W. direction from Bryson point, at the respective distances of about 1¾ and 2¼ cables— the outer rock has about 14 feet over it at lower water; the inner, about 8 feet. Both rocks appeared to have a smooth surface, and to be composed of soft granite.

Caution.—Vessels should not round Bryson point at a less distance than half a mile. *Variation*, 12¾° *E.*

25.—UNITED STATES—*Florida.—Beacon in front of the Main Light Amelia Island discontinued.*—On and after January 1, 1880, the beacon-light, which, with the Amelia island main light, serves as a range to the whole channel, entrance to Saint Mary's river, will be discontinued.

26.—UNITED STATES.—*Georgia.—Tybee Island Knoll Light-Ship discontinued.*— This light-ship at the mouth of Savannah river, will be withdrawn on January 1, 1880.

27.—UNITED STATES.—*North Carolina.—Re-establishment of Cape Fear Light with a Range Beacon.—Change in Colour of Oak Island Range Beacons.*—On and after January 1, 1880, the light

19.—New Zealand.—*Middle Isl*[illegible]
Peninsula.—*Akaroa Harbour.*—*Inten*[illegible]
The lighthouse is in course of erect[illegible]
light will be ready for exhibition [illegible] The
will be a *flashing white* light, sho[illegible]
Position, approximate, lat. 43° 54′ [illegible]

20.—New Zealand.—*Midd*[illegible] 16
Intended Light on Cape Saunders[illegible] from a
erection, and it is anticipated th[illegible] The line
early in 1880. It will be a [illegible] and N.E.
greatest brilliancy *every min*[illegible] N.,
45° 53′ 15″ S., long. 170° 45′ [illegible]

21.—New Zealand.—*Midd*[illegible]
Hokitika.—This is a harbour li[illegible]
192 feet above the sea, and [illegible] will be
The lighthouse, 18 feet hig[illegible]
white, is situated on Gaol hill[illegible]
at Hokitika river entrance. P[illegible]
long. 170° 58′ 30″ E. On th[illegible] will be
light previously shown fr[illegible] on the
tinued. [illegible] Chesapeake

22.—United States.—*Po*[illegible] visible 11½
New Light at Point-no-Point[illegible] river,
1880, a *fixed whi*[illegible] 1878. It is
shown from a to[illegible]
feet above the [illegible]
tower is painte[illegible]
dwelling, one-[illegible]
stands 200 f[illegible]
47° 54′ 41″ N[illegible]
prominent [illegible]
16 miles; [illegible]
S.E. ¾ S. [illegible]

23.[illegible]

Island.—Development of Schuyler ...ent survey shows a dangerous ...feet and a general depth over its ...2 yards long in an E. by N. and ...s wide. From its centre the west ...West Island bears N. ½ W., distant a ...north end of Cormorant rock and the Newport *in range* bear N.W. by W.; ...-house on West island, *in range* with ...northward of it, lying about one-fourth ...W. The ledge, which will be named ...way of vessels bound, from the vicinity ...'s bay. The course from Brenton reef ...kens light-ship, passes one-fourth of a mile ...ledge, and the course from the red buoy ...reef to Hen and Chickens light-vessel ...mile to the northward of it. The sea breaks ...weather.

...—*Maine.* — *Fog-Bell at Owl Head,* ...fog-bell, to be struck *four times a minute,* has ...above low water, on the edge of the bluff 100 ...Owl Head lighthouse, west side of Penobscot ...arbour.

...*of Canso.—Leading Lights at Havre Bouche.* ...879, two leading lights were exhibited from ...erected at Havre Bouche, south side of ...the gut of Canso. The low light is a *fixed* ...7 feet above high water, and visible from a ...miles. The lighthouse, 32 feet high, square, ...d painted white, is situated on the south- ...rbour. Position, lat. 45° 41′ 0″ N., long. ...high light is a *fixed red* light, elevated 107 ...and visible from a distance of about 9 miles; ...the low light, distant 473 yards. This light- ...cription to the low lighthouse.

...kept in line indicate the dredged channel ...e. *Variation,* 24° *W.*

formerly known as the Cape Fear light, on Bald head, near southern or main entrance to Cape Fear river, will be re-established, and a small beacon light will be shown in front; the two forming a range to guide through the dredged channel into the river. The main light will be displayed from the old tower, which is white and of a pyramidal form. It will be *fixed white*, lighting the entire horizon, elevation 101 feet above the sea, and visible about 16 miles. The beacon light will be a ship's lantern suspended from a stake placed about half a mile in front of the tower. The line connecting the two lights bears S.W. by W. ¼ W. and N.E. by E. ¼ E. Approximate position of the tower, lat. 33° 52′ 19″ N., long. 77° 59′ 49″ W. Bearings and distances of prominent objects are as follows:—Oak island rear light, N.W. ¾ W., 1⅞ mile; Fort Caswell, N.W. by N. 1⅜ mile. After the same date, the Oak Island range beacons, marking the Western bar channel, will be shown as *fixed red*, instead of fixed white as at present.

28.—United States.—*Maryland.*—*Light on Jane Island, entrance to Little Annamessex River.*—On and after December 20, 1879, a *fixed white* light, lighting 315° of the horizon, will be shown from the screw-pile lighthouse recently erected on the southern end of the shoal extending from Jane island, Chesapeake bay; elevation 40 feet above mean low-water, and visible 11½ miles. The light serves as a guide into Little Annamessex river, and replaces the one destroyed by ice in January, 1879. It is about 300 feet west from the old lighthouse. The superstructure is white; roof and foundation, brown. Approximate position, lat. 37° 57′ 51″ N., long. 75° 55′ W. During thick and foggy weather a bell will be struck by machinery every *fifteen seconds.*

29.—United States.—*New York.*—*Long Island Sound.*—*Change of Fog-Signal at Execution Rocks.*—The fog-signal trumpet has been replaced by a trumpet of the first order, operated by caloric engines, which gives a blast of 7 seconds' duration, at intervals of 43 seconds.

30.—United States.—*Long Island Sound, New York.*—*Change of Characteristic of Light at Stratford Shoal.*—On and after December 15, 1879, the intervals between the flashes of this light will be changed from fifteen seconds to *ten seconds.*

31.—United States.—*Rhode Island.—Development of Schuyler Ledge off Sakonnet Point.*—Recent survey shows a dangerous ledge with a least depth of 8 feet and a general depth over its surface of 12 feet. It is about 82 yards long in an E. by N. and W. by S. direction, and 33 yards wide. From its centre the west gable of the club-house on West Island bears N. ½ W., distant a little over one-half mile; the north end of Cormorant rock and the cupola of the Ocean house at Newport *in range* bear N.W. by W.; and the eastern end of the ice-house on West island, *in range* with a small rocky island, to the northward of it, lying about one-fourth mile from shore, bears N. ⅛ W. The ledge, which will be named *Schuyler ledge*, lies in the way of vessels bound, from the vicinity of Newport, into Buzzard's bay. The course from Brenton reef light-ship to Hen and Chickens light-ship, passes one-fourth of a mile to the southward of the ledge, and the course from the red buoy on the end of Brenton reef to Hen and Chickens light-vessel passes one-eighth of a mile to the northward of it. The sea breaks over the ledge in heavy weather.

32.—United States.—*Maine.*—*Fog-Bell at Owl Head, Penobscot Bay.*—A fog-bell, to be struck *four times a minute*, has been placed 50 feet above low water, on the edge of the bluff 100 feet north-east of the Owl Head lighthouse, west side of Penobscot Bay, off Rockland Harbour.

33.—Canada.—*Gut of Canso.—Leading Lights at Havre Bouche.*—On 8th October, 1879, two leading lights were exhibiter guilty lighthouses recently erected at Havre Bouche, southare of his northern entrance to the gut of Canso. The low light isato sus- *white* light, elevated 37 feet above high water, and visible ... distance of about 9 miles. The lighthouse, 32 feet high, square, constructed of wood and painted white, is situated on the south- west shore of the harbour. Position, lat. 45° 41′ 0″ N., long. 61° 31′ 15″ W. The high light is a *fixed red* light, elevated 107 feet above high water, and visible from a distance of about 9 miles; bears S. 37° W. from the low light, distant 473 yards. This light- house is similar in description to the low lighthouse.

Note.—These lights kept in line indicate the dredged channel entering Havre Bouche. *Variation*, 24° *W.*

HYDROGRAPHIC NOTICES RECENTLY PUBLISHED BY THE HYDROGRAPHIC OFFICE, ADMIRALTY, 1879.

No. 24.—MEDITERRANEAN PILOT, Vol. II., Notice 1; information relating to currents on the South Coast of France.

No. 25.—AUSTRALIA DIRECTORY, Vol. I., Notice 6; information relating to portions of the South Coast of Australia, between East Mount Barren and Eucla.

OUR OFFICIAL LOG.

OFFICIAL INQUIRIES AT HOME, 1879.

(*This List is completed to the 18th of each Month.*)

422. *Villa Franca*, barque; built at Bath, U.S., 1859; owned by Mr. A. Elford, of London; tonnage, 1,031; Tyne to Carthagena; coals, &c.; lost near Cromer, coast of Norfolk, October 13, 1879. Inquiry held at Greenwich, October 30, 1879, before Balguy, Stipendiary Magistrate; White and Parfitt, N.A. Second mate to blame for taking inaccurate soundings; his certificate suspended for three months. Master in default for not taking proper steps to get the ship afloat after stranding; his certificate suspended for six months.

423. *Ella Mary*, schooner; and *Electric*, s.s.; the former built about 300 ton, in 1871; owned by Mr. W. Postlethwaite, of Holborn is white ; [Cum]berland; tonnage, 80; Rouen to Liverpool; sand; the lat. 37° 5' ... at Glasgow, in 1863; owned by the Belfast Steam... Company; tonnage, 571; in collision near Formby lightship, river Mersey, October 17, 1879, whereby loss of life ensued. Inquiry held at Liverpool, October 31, 1879, before Raffles, Stipendiary Magistrate; Harris, Powell, and Wilson, N.A. Court found mate of *Electric* to blame for not slowing his engines when approaching so closely to another vessel. Certificate suspended for three months.

426. *Albion*, s.s.; built at ...artick in 1865; owned by the London and Edinburgh Shipping Company; tonnage, 143; Gibraltar to West Coast of Africa; ballast; sustained serious damage

through the falling in of the crowns of the furnaces. Inquiry held at Leith, November 3, 1879, before Pentland and Powrie, J.P., Ward, N.A., and Ravenhill, E.A. Accident caused by the water in the boiler being allowed to become too densely saturated with salt. Chief engineer admonished to be more careful in future.

247. *Belfast*, s.s.; built at Dublin in 1866; owned by James Douglas, of Belfast; tonnage, 31; engaged in towing in Belfast Lough; sustained material damage by the falling in or sagging of her furnaces, September 29, 1879. Inquiry held at Belfast, November 7, 1879, before Clifford-Lloyd, J.P.; Castle and May, N.A. Casualty caused by the ignorance and carelessness of the engine-driver engaged by the owner. Owner directed to pay the costs of the investigation.

Official Inquiries Abroad.

425. *Tambaroora*, s.s.; lost on the coast of Australia, July 22, 1879. Inquiry held at Rockhampton, September 8, 1879. Casualty due to the culpable negligence of master, mate, and second mate, whose certificates were cancelled.

427. *Loch Leven Castle*, barque; abandoned at sea, August 23, 1879. Naval Court held at Valparaiso, October 6, 1879. Court found that the ship was prematurely abandoned, and suspended master's certificate for six months.

428. *Lady Belhaven;* lost on Argo Flat, Bay of Bengal, July 3, 1879. Inquiry held at Calcutta, August 16, 1879. Master guilty for continuing his cruise to the northward although unaware of his true position, also for neglecting to use the lead. Certificate suspended for twelve months; recommended for one as mate during that time.

430. *Sea Gull*, s.s.; lost on a reef, three miles from Island Gafor. Inquiry held at Colombo, September 30, 1879. Casualty due to an error of judgment. Master censured.

431. *Castleton*, s.s.; stranded on Ricasoli Rocks, November 8, 1879. Inquiry held at Valetta, Malta, November 24, 1879. Accident caused by the heavy sea, and want of foresight on part of master in not reversing his engines. Warned to be more careful in future.

432. *Houssa*, s.s., and Royal Mail steamship *Cameroon;* in collision in the harbour of Freetown, October 12, 1879. Inquiry held at Freetown, Sierra Leone, October 15, 1879. Master and mate of *Houssa* to blame for negligent navigation. Master's certificate suspended for six, and mate's for two months.

433. *Ava*, s.s.; and *Brenhilda*, ship; in collision in the Bay of Bengal, May 24, 1879, when the *Ava* foundered, and many lives were lost. Inquiry held at Calcutta, August 30, 1879. Master of *Brenhilda* in default; certificate suspended for three months.

GENERAL.

Traverse of a Current Bottle in the Great Southern Ocean.—A bottle thrown overboard from the barque *Indus*, by Mr. J. de Zouche, M.D., when in lat. 58° 20′ S., long. 87° 13′ W., about 20 degrees west of Cape Horn, was recently picked up on the beach near Cape Bridgewater, Australia. Assuming that it was picked up soon after its being thrown on the shore, the distance was traversed in about one year and ten months, at the average rate of eight to ten miles per day, round Cape Horn, past the Cape of Good Hope, and thence to Australia. We learn the particulars from Mr. J. de Zouche, who is now settled in Dunedin, New Zealand: during the voyage, from Brisbane to England, in 1867-7, he threw fifty current bottles overboard, and this is the first of which anything has been heard.

Group Flashing Lights.—The change in the light at the Leman and Ower has already been noticed in the *Nautical Magazine;* but the Trinity House has issued the following further additional remarks on the subject, which deserve careful consideration :—
"The attention of mariners is particularly directed to the character of this light being 'group flashing,' and not that of an ordinary revolving light. The two flashes occur quickly one after the other, and are followed by a comparatively long interval of darkness; the intervals being approximately 2½ seconds of light 5 seconds of darkness, 2½ seconds of light 20 seconds of darkness."

A VESSEL FINED FOR BREAKING A TELEGRAPH CABLE.—The *Alta California*, of Nov. 21st, says, that "the Western Union Telegraph Company have obtained judgment in a Justice's Court against the schooner *Dreadnaught* for breakage of their submarine cable in Oakland." Whether the award is legitimate or not remains to be again decided. Nevertheless shipmasters should always carefully avoid bringing up in the vicinity of, and between, the buoys that mark the position of such cables. Besides the possible detention of the ship on behalf of the Telegraph Company, the breakage of a cable may (at times) seriously interfere with commercial and political transactions.

NEW YORK PILOTAGE.—There is at the present time a struggle going on between shipowners, masters and merchants, and the pilots of New York. The exceedingly high rates for pilotage have for some time been a source of much discontent, not only among masters and owners of foreign vessels frequenting the port, but also among merchants and shipowners of New York itself and other United States ports, and the discontent has at length found vigorous expression. The pilots have been invited to reduce their charges by 33 per cent., and to make other concessions, which would have the effect of making the pilotage service more generally patronised and not evaded, as is now so frequently the case. The pilots will not, however, yield to anything like the full extent of the demands made, and so the matter is to be brought before the Legislature, where the contest will no doubt be vigorously carried on. New York has been for a long time a sort of stronghold of compulsory pilotage, the navigation of the channels leading up to the port being full of dangers and difficulties, but now that the shipping interests have so forcibly attacked the present arrangements, we may look for the ultimate abolition of the compulsory system, for the Americans will not be slow to discover that by free-trade and open competition they may be as well served, in regard to pilotage, as by the present system of close monopoly, exorbitant charges and limited number of pilots.

STEAM NAVIGATION OF THE UNITED STATES.—Mr. James A. Dumont, Supervising Inspector-General of Steam Vessels, in his annual report, shows that during the last fiscal year there have

been 4,289 steamers inspected and 15,212 officers licensed. The total number of lives lost by accidents from various causes aggregate 177, forty-four of which are not chargeable to accidents resulting from the use of steam in navigation. Of the whole number of lives lost on steamboats, during the year, 46 were passengers. After giving a detailed statement of fatal accidents by districts, General Dumont says: "It is a gratifying fact that notwithstanding an increase of 400 vessels to the steam merchant marine of the United States since the report for the fiscal year ending June 30, 1875, there has been a steady decrease in the number of total casualties although the passenger-capacity of the steamers since built is much greater, as illustrated in the difference between the steamers then running from New York to Rockaway, with an aggregate capacity of about 1,800 passengers, and those now running upon the same route, with a total capacity of about 7,000 passengers. The fatal casualties reported during the past five years, including those given in this report, aggregate as follows: 1875, 607; 1876, 395; 1877, 224; 1878, 212; and 1879, 177. To the severe discipline exercised by this service over the conduct of the licensed officers of steam-vessels, he says is no doubt largely due this exemption from disasters. Every report affecting the conduct of an officer of steam vessels is promptly investigated by the local inspectors, and if the officer is found guilty of incompetence, misbehaviour, negligence, unskilfulness, or the use of intoxicating drink, his license as an officer is at once suspended or revoked under the powers conferred upon the Inspectors by Section No. 4,450 of the Revised Statutes. The promptness with which this course of discipline is carried out has effectually put an end to accidents that were formerly of frequent occurrence."

THE
NAUTICAL MAGAZINE

FORTY-NINTH YEAR.

VOLUME XLIX.—No. II.

FEBRUARY, 1880.

THE DIFFICULTIES OF WEATHER PREDICTION.

THE interest which attaches to any attempt to lift a corner of the curtain which hides the future of weather from our eyes, is easily intelligible when we recollect the priceless value of the result were any success assured. There is hardly a civilized country which does not set apart funds for the study of meteorology, and one of the chief, if not the very chiefest, of the objects of that science is the prediction of weather.

In climatological enquiry we maintain stations year after year in order to afford evidence of the character of the successive seasons, and from the conditions and variations recorded we draw conclusions as to the conditions and variations to be expected in each district. These conclusions enable us to judge what crops will be likely to succeed, what live-stock will suit the country best, and to what diseases the inhabitants will most probably be exposed. What is all this but weather prophecy?

Again, we search laboriously through log-books to find the true distribution of meteorological conditions over the sea, in order, in Basil Hall's words, to tell the seaman "where to find a fair wind, and where to fall in with a favourable current." What is this but forecasting on a large scale?

In fact, there is not a profession, not a trade, not an occupation, which is not more or less dependent on weather, and which would not derive the greatest benefit from any attainable fore-knowledge of its course.

This being the case, it may well be asked why the ordinary rules which govern supply and demand are inoperative in this case; why the demand for weather knowledge does not produce a class of men able to supply it, and why the European public, in the nineteenth century, catches at the slightest hopes of trustworthy weather prediction with the same eager attention as the Red Indian pays to the utterances of his medicine man, or the Caffre to those of his rain doctor?

At the present time there is not in the wide world a meteorologist of accredited reputation who will undertake to foretell the weather for even three days in advance, much less who will tell a captain leaving London what weather he will meet before he gets clear of the Channel?

It is easy for newspaper writers to assert that the problem *has* been solved, but not one of such weather prophets will consent to submit his statements to discussion before a strictly scientific audience, or even to be bound by the literal interpretation of the words in which they are couched.

Science is measurement, and in other branches of science we have simple numerical tests of the truth of hypotheses; but in meteorology, a prophecy of a storm for a certain day is held both by its author and by those of the public who may happen to experience it, to be as completely fulfilled by a squall of half-an-hour's duration, as by a gale which lasts for a couple of days. Weather prophets habitually refer to popular recollection of the occurrence of a gale, and call up the ubiquitous oldest inhabitant to prove its violence, much as John Doe and Richard Roe appeared in old legal fiction, trusting, as they safely may, to the fact that not one per cent. of their hearers will take the trouble to test the precise accuracy of their statements.

It has repeatedly been asserted that certain storms exhibit a periodical recurrence, and, as a striking instance of this, the squall of March 24th, 1878, in which H.M.S. *Eurydice* capsized,

has been emphatically cited. The alleged period of return of this disturbance is 28 days. The essential feature of this squall, as pointed out by the Rev. Clement Ley, who published in *Symons' Meteorological Magazine*, for April, 1878, a most careful discussion of it, was that it advanced across the country from north to south with a front like a wall, developing great violence of wind in some places where the current was confined by the local configuration of the ground. The very gust which struck the *Eurydice* was hardly felt at a distance of half-a-mile from her, and had it not been that that luckless craft was in what we may call the line of fire of the blast, the squall would hardly have been dignified with the title of a storm.

The direction of the wind on this occasion was northerly, and its greatest force was off the Isle of Wight, while it was not connected with any great cyclonic disturbance crossing the country; and yet we hear that predictions of its recurrence are completely fulfilled by southerly gales connected with a serious barometrical disturbance, and felt in the North of Scotland. The assertion does not deserve a moment's attention!

Again, the announcement of the discovery of a regular recurrence of meteorological events, coincident with the supposed eleven-year period of solar spots, has of late attracted very general notice, but when we come to apply to this theory the rude test of practical utility and common sense, we find that even its most enthusiastic advocates admit that the time for safe prophecy has not yet arrived. We need only point out that not one of the sun-spot men ventured to predict the prolonged cold of last winter, the all but incessant rain of last summer—at least in England, or the early and severe frost from which we have just emerged. There was the same absence of spots from the sun's surface in the winter of 1877-8 as in that of 1878-9, and yet the resulting weather betrayed no signs of family resemblance.

To take a final instance we may safely ask any unprejudiced seaman what has been the practical value to him of the warnings with which we have been so freely supplied by the munificence of Mr. Bennett, of the *New York Herald*. In the form in which these telegraphic announcements are usually couched, they apply to

"the coasts of England and France, affecting those of Norway." This sweep of the net takes in some twenty degrees of latitude at least, and we may safely say that no instance is on record of the same gale being felt in the same way over so enormous an area. Supposing a captain is in the port of London, or even at Falmouth, we can hardly think that it is of much use to him to receive warning of a gale which only visits the Shetlands and the coast of Norway. At the time that such an occurrence takes place, it is more than probable that he is lying all but becalmed on the south coast, with a barometer ranging considerably over thirty inches; for the passage of cyclonic disturbances outside our northern coasts is generally associated with the presence of an anti-cyclone over the south of England.

But, even if the *Herald* warnings were perfectly correct, they rarely profess to give more than 48 hours notice of a coming storm, and this interval is quite insufficient to allow a ship leaving London to get clear of the Channel.

On the whole, the evidence is irrefutable that in the month of January, 1880, meteorologists are utterly unable to tell the farmer whether he will have an early or a late, a dry or a wet, spring, or even to announce to the seaman, with any certainty, his general chances of weather for even a week in advance.

This is a humiliating confession to have to make, and I shall endeavour in the following pages to show what are the inherent difficulties in the problem, and the defects in our mode of attacking it, which render us so helpless when we attempt weather prediction on a large scale.

In the very first instance, we have to admit our all but total ignorance of the proximate causes to which the rise and fall of the barometer, and even the very wind that blows, are due. Our system of weather telegraphy simply derives its efficiency from the fact that telegraphic messages travel more rapidly than the storms which they announce; and so, speaking generally, it is possible to give some intelligence of the approach of a storm. But, to give this usefully, we ought to know the superficial extent of the disturbance, with the rate and direction of its motion, its nature and intensity, and whether it is increasing or diminishing

in severity. There is not one of these points on which the state of our knowledge is at all satisfactory. We lack the data on which to base our induction. We, in these islands, are particularly badly off in this respect, as we have the Atlantic on the weather side of us, for at least nine-tenths of our storms come to us from the west and north.

Our cousins in the United States are far more advantageously circumstanced for gaining information of existing conditions of weather. Their central office is situated to the eastward, and their telegraphic system embraces an area more comprehensive, as regards extent of territory and variety of climatological conditions, than that which is at the service of any meteorological organization in Europe. In the States, therefore, it is possible to learn what is actually occurring over a very extensive area, and thereby to announce the coming weather with a very considerable amount of certainty; but even in America meteorologists have not yet arrived at any important conclusions as to the causes to which storms owe their origin, or to which the rise and fall of the barometer are due. As to this latter point, an influential section of meteorologists attribute all our storms to the condensation of vapour, but they do not explain how it comes to pass that the rain comes with the storm instead of preceding it, and that our heaviest rain deluges are not necessarily accompanied by any cyclonic disturbance at all.

Again, as to the very nature of the storms themselves we have much to learn. The doctrine may be thought heretical to propound, but we do not know accurately what is the real shape of any of these great systems of atmospherical disturbance.

Even the very West India hurricanes and the typhoons of the Indian seas, on which Redfield, Reid, and Piddington based the Law of Storms, are certainly not simple revolving discs of air moving over the earth's surface like a boy's top over the floor. If this were the case, the effect of the motion of translation must be perceptible in a contrast between the violence of the wind on opposite sides of the storm.

Taking a West India hurricane, which advances from south-east to north-west, while crossing the latitudes of the North-east trade,

if we assume its rate of progression to be 15 miles an hour, an ordinary speed in that region to which I am alluding, and the average hourly velocity of the wind in the system to be 60 miles, a moment's reflection must show us that the S.E. wind must be felt at a fixed observatory as blowing at the rate of 75 miles an hour, while the N.W. wind cannot attain a higher velocity than 45 miles. Such a contrast as that described between the two sides of a cyclone must surely have attracted notice in the West Indies or the Bay of Bengal, if it really existed.

As for our own storms, which, when they assume the complete cyclonic form, differ only in degree from tropical hurricanes, the contrast would be much more striking, for these systems travel very rapidly, occasionally moving at the rate of 40 miles an hour and even more. When these systems move from west to east the westerly winds should have their velocity increased by 40, while that of the easterly winds should be reduced by an equal amount.

On this hypothesis therefore it would be all but impossible for an easterly wind ever to attain the force of a gale, and yet the eastern coasts of Great Britain can bear testimony to the violence with which that wind, somehow or other, manages to blow.

Moreover, the contrast which always exists in these latitudes between the southerly and south-westerly gales, which blow with a high temperature and falling thermometer, and the north-westerly gales in the rear of the storm which come down upon us, causing the barometer to leap up as much as four-tenths of an inch in two hours (as on March 12, 1876), and the barometer to drop instantly, and bringing on hail-squalls, and their concomitant thunderstorms, is such that it is inconceivable that the actual particles of the air coming from N.W. can have formed a portion of the warm south-west current a few hours before.

It appears absolutely necessary to assume that the air in a storm should be drawn from two independent sources at least, and it seems evident that these storm eddies must be in a continual state of dissolution and reconstruction as the system moves over the surface of the earth.

Again, as to their very character and shape we are far from being quite clear. Distinctly circular eddies they are not. There

is not a single cyclone on record of which the truly circular shape has been proved by a reasonable number (say 50) of strictly simultaneous observations uniformly distributed all round the centre. It is not sufficient to take the wind observations from half-a-dozen logs, and to say that, if these do not accord with the circular theory, the observations themselves must be faulty.

As to our own storms, the overwhelming majority of them have, so to speak, no northern sides at all, as far as Europe is concerned, and the only winds developed in them are those from S.E. veering to N.W., a change which is at times manifested within the space of a few hours over the whole extent of the British Isles from Shetland to Scilly.

There can be no doubt that the character, track, and shape of all storms is in close connection with the general distribution of atmospherical pressure in their neighbourhood, and as far as we are concerned, as the region about Iceland is one of great deficiency of pressure in winter, it is exceedingly seldom at that season that the barometer can rise high enough, say at the Faroes, to produce a gradient of sufficient steepness to give rise to strong easterly winds in the North of Scotland. The prevalent disposition of pressure in our storms is that of a trough sloping northwards, and open on its northern side.

It is for the mathematicians to explain how such disturbances can be formed in the atmosphere; the evidence of the charts published day by day amply proves that they exist.

Again, as to the motion of the air in a cyclone. The older writers always assumed when facing the wind the centre of the hurricane bore exactly eight points away to the right in the northern, and to the left in the southern hemisphere. This rule is very simple and easily remembered, but unfortunately it is not confirmed by recent investigations. Not only did Redfield and Piddington suspect that the motion was vorticose and spiral, but there is not a single independent enquirer into the subject of late years who is not an adherent of that view, while the researches of Meldrum, Toynbee, and, within the last year, of Eliot, have proved its truth. The very last paragraph of Eliot's masterly report on the Madras cyclone of May, 1877, runs as follows:—

"The air motion in cyclones is one of indraught, and therefore the wind direction at any point is not at right angles to the direction of the centre. The stream lines, or the lines of air motion, are spiral curves. The relation between the wind direction and the direction of the centre is probably not invariable, but depends upon the intensity of the storm or the baric gradient. The law laid down by Mr. Willson in the Report on the Midnapore cyclone is probably the nearest approximation. It is—'with the face to the wind, the direction of the centre is from ten to eleven points to the right-hand side.'"

It is, therefore, evident that meteorologists must look to the physicists and mathematicians for a more complete explanation of the genesis of storms than they at present possess, before they can feel at all certain of the conditions under which they arise. Mr. Eliot, in the Report which has just been quoted, devotes an immense amount of attention to the origin of the cyclone he is describing, which he attributes to a heavy and persistent rainfall: "the immediate antecedent is heavy rainfall concentrated over a portion of the bay, accompanied by strong indraught, &c., &c." He, however, is unable to tell us what has produced the rainfall: what has set the ball rolling. Mr. Eliot fairly enough criticizes other theories, but he lays himself open to the same charge which he brings against others: he has not fully demonstrated the ultimate principle underlying the whole phenomenon.

When we have thus seen how little we really *know* of the phenomena manifested in the air about us, it is only fair, by way of justification for the shortcomings of our science, to point out some of the reasons for our helplessness.

In the first instance, we are dependent for our information as to the actual weather which is prevailing about us, on reports from a number of stations distributed over the country; but we cannot afford, on the ground of cost, to receive information frequently enough, or from a sufficiency of stations; while the information itself is not sufficient in quality. These observations are necessarily taken by landsmen, who are shut up in offices or houses for several hours in the day, and are quite debarred from the constant opportunity of watching the weather and its changes

which is enjoyed by the seaman at sea. In short, the reports which we receive are not such as we should expect to get could we learn from an experienced captain off the coast the description he would give of the look of the clouds and sky. Moreover, even if the reports were full and accurate enough when framed, it would be impracticable to telegraph them. It is, therefore, clear that meteorologists suffer from deficiency of information.

There is, however, one all-important obstacle in the way of our gaining a knowledge of the condition of the atmosphere as a whole. We know literally nothing of the phenomena taking place above our heads; the stratum of air with which we are dealing, in the way of gauging its condition and its motions, is infinitesimally small as compared with the heights of the atmosphere itself.

There is not a station in existence where observations are regularly taken 100 feet above the level of the ground, and if we come to elevation above sea level, the mountain stations are few and far between, and the highest of them all, Pike's Peak, in the Rocky Mountains, only attains the level of about 14,000 feet. Observations have certainly been made at various heights in balloons, but these efforts are necessarily spasmodic, and simply furnish facts to serve as a basis for theories of the general condition of the upper air. They certainly can never be expected to afford us constant intelligence of the phenomena of weather prevailing over our heads.

It is our ignorance of the amount of moisture in the higher strata which prevents us from forecasting quantitatively the amount of rain which is likely to fall. We may, and do, know when thunderstorms are likely to occur, but we cannot say beforehand whether the rain that they bring us will measure a quarter of an inch or ten times as much. That knowledge of the condition of the air even 9,000 feet above us would be of great value, is shown by the fact that on one occasion, a few years ago, General Nausonty, on the Pic du Midi, knew, by the setting in of a warm wind with rain, at his high station, that floods must ensue in the valleys below, and had he possessed telegraphic connexion, he might have issued warnings fully two days before the calamity occurred.

The fact is, that considering the manifold deficiency of the data on which we have to base our predictions, it is a comfort to know that we can score any success at all for them, and that we do score a fair amount, the testimony of our coasting population is amply sufficient to show.

There is, however, one remark which ought to be made with reference to the prediction of weather. We hear the opinion very commonly expressed that the barometer is of no use now-a-days; that on such and such an occasion rain came with a rising or dry weather with a falling glass; or captains tell us that in their experience the barometer is of no service near Cape Horn, where its usual height is more than half an inch below the level to which we are accustomed in corresponding latitudes in the Atlantic.

All such remarks simply show us that the schoolmaster is abroad, and that people are paying more attention to their instrumental readings and to the weather in general than they did twenty years ago. A single barometer will not enable us to form an accurate judgment of coming weather; firstly, because the weather, as far as the barometer is concerned, depends not on the actual reading at any one place, as would appear from the words "fair," "change," &c., on old barometer scales, but upon the simultaneous changes going on over the surrounding country; and secondly, because readings of the barometer must be combined with careful observations of the changes which have taken place in the thermometer and hygrometer, in the direction and force of the wind, and above all in the character, height, and motion of the clouds.

The last-named observations are the most important of all, but they are by far the most difficult to make, as the faculty of forming a correct opinion on them at once places its possessor on a very high level indeed as regards the valuable power of predicting local weather.

In conclusion, we must only say that though accurate prognostication of coming weather is at present impossible, the solitary observer need not utterly despair. Buys Ballot's law of the relation of wind to barometric pressure shows us that the direction of the wind always indicates roughly the bearing of the region of lowest pressure in

the neighbourhood of a station, and the rise or fall of the barometer itself, taken in conjunction with the changes of the wind, gives very useful information as to the motion of the system of low pressure, whether it is approaching to or receding from the station. In fact a careful observer of barometer and wind may form a good idea of the weather immediately coming, especially if he is a good judge of clouds and weather.

The power of a single observer is the mainstay of our seamen's weather knowledge, for they are necessarily isolated, and to that power we must cling till our scientific men give us something better.

LOSSES OF GRAIN SHIPS.

OUR pages, like the columns of our excellent contemporary, *The Shipping and Mercantile Gazette*, have for some months contained letters and articles on the subject of the dangers of cargoes of coal and grain arising from their stowage, and some very pertinent remarks and suggestions have been thrown out concerning the causes of the great losses which have recently happened. The letters on the subject have been almost exhaustive, and many of them have been marked by an unusual amount of ability and completeness. The conclusion to be drawn from the discussion, letters, and notices down to this time is, that if grain is carried in bulk, it ought to be only so carried in ships which, owing to their form and construction, can carry it in safety.

If a ship is deep in proportion to her length and breadth, and if she is loaded with a bulk cargo in such a way as to give her a very small freeboard, and at the same time to give her little or no stability, it is not surprising that she should manifest an inclination to roll. She is very much like a barrel, so far filled with water as just to enable it, when thrown into the sea, to present a small part of the surface of its circumference above the water. If at the same time no weight is attached to any part of the circumference of the barrel to keep that part downwards, the

barrel will certainly roll over and over. If instead of placing a weight on a part of the circumference, a bladder of air is attached, the barrel will then assume a position in which the air bladder will be on the surface of the water. Given, therefore, a ship deep in proportion to her breadth, with air spaces at the bottom, and the hull so filled up that the vessel has little or no stability when upright, and is at the same time very low in the water, and further given the fact that she is turned on one side by the wind or sea, and that the cargo moves over towards that side, is it surprising that the ship acts as the barrel would act, and turns her air bladders (ballast tanks) upwards. Yet this simple experiment or demonstration goes on at intervals, and every one wonders. They do not, however, wonder that the experiment or demonstration should invariably come out as it does, but they profess to wonder that another well-found, seaworthy, highly-classed ship (and her crew) should disappear! If in addition to the exceedingly favourable provisions and conditions provided for rotating a ship on her longitudinal axis, to which we have already referred, the circumstance that there may also be a lodgment space on deck, for from 60 to 150 tons of water, and that there may often perhaps be greater facilities for this water finding its way down into the ship than over the side, the matter seems to be fraught with still more wonder. It is possible that Mr. Plimsoll's disc is sometimes one of the agents in securing danger. We have, for instance, noticed that in some ships a solid plate is carried a foot (more or less) above the side at the deck planking, near the water-way; that it has a moulding round its upper side, and the openings for relieving the deck of water are *above* it. This may give a fine *appearance* of freeboard, but it is questionable as regards safety, especially when solid iron bulwarks with but few openings are above it.

Our contemporary, *The Shipping and Mercantile Gazette*, informs us that an "understanding" has been "arrived at with the Board of Trade, by the Associated Chambers of Commerce, and the Chamber of Shipping, that in future no prosecution should be instituted against masters or owners under the Act of 1876 with reference to the shipping of grain cargoes stowed in bulk, where it

could be shown that the *ordinary* precautions had been taken at the port of shipment of the cargo," and goes on to say that "the law relating to the stowage of grain must be amended," and that "if responsibility is to be forced on shipmasters and shipowners there must be at all events some definite rules for their guidance," and our contemporary goes on to point out the direction these rules should take, saying "the remedy for the existing evil and danger will be, not merely in stowage rules however stringent, but in rules relating to the proportions and construction of sea-going ships," and it hints at the question whether Parliament may possibly make such rules.

We know nothing of the complete agreement said to exist between the Board of Trade and the shippers of grain as to not prosecuting in cases when the existing law is broken. But we do hope, in the interests of all parties, that the treaty or understanding, whatever it is, between the Board of Trade and the shipowners as to "ordinary" precautions, only refers, if it exists at all, to "ordinary" ships. For the Board of Trade to undertake that it will not prosecute if the law is broken when "ordinary" precautions are taken in ships which require "extraordinary" precautions to ensure even a common amount of safety, seems to us so strange that we cannot and do not credit it.

We look, however, with great alarm on the proposal of our contemporary as to statutory provisions, concerning stowage rules, however stringent, and rules as to the proportion and construction of ships. This is out-Plimsolling Plimsoll; Mr. Plimsoll only proposed that all ships should be driven compulsorily into classification, but seeing that most of the missing ships were classed and bore very high characters, he may perhaps be now convinced that even his comparatively mild remedy would not have affected the question of safety. We told him so at the time, and we trust he sees it now.

Our contemporary thinks, however, that the time has come for inquiry into the causes of loss of ships carrying grain. But surely he overlooks the fact that inquiry is held in case after case by the Wreck Inquiry Courts! One would think that there is inquiry enough already. If, however, our excellent contemporary means

that to be of use in lessening loss of life, inquiry should be of another sort, then we are not indisposed to agree in the conclusion at which he has arrived, that the "losses have reached a point at which inquiry has become imperative, with a view to ascertaining how these recurring sacrifices of life and property may be best prevented." We have remarked on more than one occasion that the results of the inquiries of the Wreck Court produce little or no effect on the mass of constructors, designers, owners, masters, and loaders of ships. They punish officers, it is true, but that is a very poor result to the British taxpayer as compared with their assumed importance and great cost. We are not blaming the framers of the reports of the Wreck Court; it is not their fault that their reports do not bear the desired fruit. Legislation of the strait-jacket order may be useless or mischievous; extended inquiry can alone decide that it shall not be.

WATER BALLAST AND GRAIN CARGOES.

(*Communicated.*)

THE recent unfortunate losses of grain-laden steamers in the Atlantic have been the cause of the revival of a question which was the subject cf much debate a few years ago, when a larger number of similar losses occurred in quick succession. As the vessels in recent cases had the water ballast tanks which are so common now in new steamers, it has been alleged that water ballast, as well as the carriage of grain in bulk, is a source of special and peculiar danger. It is stated that during the next session further legislation will be proposed, prohibiting the carriage of grain otherwise than in bags. We have not yet heard, however, that any one proposes to legislate against water ballast tanks; but from what has recently been said against them, even such a proposal would not astonish us. A few weeks ago, a letter appeared in the *Times* on the subject, in which we are told of serious dangers due to the fact that "the upward pressure of the air in the water ballast compartment acts with increasing force the more the vessel is inclined from the upright."

The truth is, that dangers such as they, due to the empty ballast tank, so far from being caused by the air in it, would be slightly increased if there were no air at all, that is, if it were *absolutely* empty. After all that has been written upon the subject of the stability of ships during the last dozen years, in the way of popularising long known scientific truths, it is somewhat discouraging to find men, who evidently have some practical acquaintance with nautical subjects, falling into such absurd errors as to the effect of air in the double bottom. Other things being the same, the empty water ballast tank diminishes the stability of a ship simply because the cargo is higher than it would be if it were placed upon ceiling laid upon the ordinary floors of the ship. This effect, however, is a matter of easy calculation, and in well-planned ships it is taken into account in the general design. Every steamer should be so designed that when at her load displacement, with the ballast tanks empty and the holds filled, or nearly filled, with a cargo of medium density, such as coals or corn, there should be a fair margin of stability. Stability, so far as it depends upon form, is increased by increased beam, decreased by increased depth or greater fulness below water, so that if the design of a ship at first intended to have no tank, is to be altered to give her one, she should either have greater beam given to her, or her ends below water should be made finer. Till recently it was pretty generally believed that increase of beam necessitated increased power of propulsion, it was even affirmed in some quarters that a long parallel midship body might be put into a ship, without providing more than a trifling increase of steam power for its propulsion. The researches of the late Mr. Froude, however, have conclusively shown that, preserving the same displacement, the ship's breadth may often be advantageously increased, greater speed being obtained with a large breadth and fine lines than with a smaller breadth and fuller lines. It has also been said that Lloyd's rules discourage increase of beam, and encourage increase of depth, and Lloyd's rules have often been blamed when the naval architect was really at fault. It may be readily admitted that Lloyd's rules for the scantlings of iron ships are not in any sense scientific, that they do not provide strength in a ship in any

way proportioned to the strains to which she is liable; they are not, however, open to this particular objection of encouraging deep ships. Lloyd's rules for scantlings depend mainly upon two quantities: the length, and the measure round of the half midship section. Other things being the same, greater longitudinal strength is obtained for greater depth, but the consideration that the ship may be subject to longitudinal strains when inclined at an angle, leads to the conclusion that a limit to advantageous increase of depth would be reached when it was equal to the breadth. Lloyd's rules, however, require that the thickness of iron shall be the same whatever the form of the midship section, whether that form be one of natural strength or not, the only measure taken by them being the periphery of the half midship section. It is true that when the length is so great, in comparison with the other dimensions, that the vessel comes under the rules for "extreme proportions," extra strength is very properly determined by the ratio of length to depth; and this may have given some colour to the charge against the rules, that they encourage depth. On the whole, it cannot be said that Lloyd's rules encourage deep ships. We do not for that reason commend the rules, because we think the one principle upon which rules for scantlings of ships should be based, is the provision of strength to meet probable demands upon it. If the committee of the Registry find that ships are being built of such form that, under ordinary conditions of stowage, they are unseaworthy, could they not deal with the question of stability by itself, and refuse a class to any ship which, when loaded, say with coal, was deficient in stability?

There is, however, one most unsatisfactory feature in many ships of recent design, referred to in an able communication,* which we published last month. We refer to the great height of the port-sills above the deck; in some cases we have noticed it to be from fifteen to eighteen inches. This is occasioned by the sheer strake being unnecessarily high, no doubt very much improving the look of the ship, and increasing the apparent freeboard, but really introducing an element of danger, which, in some

* *Nautical Magazine*, January, 1880, p. 38.

cases, may be very serious. Ships of the type to which we refer have very high coamings—often more than three feet—and thus there is *little* fear of the hatches being smashed in; but if the ship takes in a sea, and is not able to free herself from it at all for a height of fifteen inches, and only very slowly for a greater height, it is not to be wondered at that serious consequences may follow, when perhaps she has but a small margin of stability. Besides being too high to do their work properly, the wash-ports are frequently too small, or, if of a good area, they are unnecessarily high, and not of sufficient length, and thus their full area is only available when the water is very high on the deck. Vessels of the type to which we refer have often large deck erections—a topgallant forecastle, a bridge-house, and a poop; these all help to increase the apparent free-board, but the real freeboard of the ship is the height of the lowest part of her upper deck from the water, and that is often, we fear, so low that, if the cargo shifts a little, the vessel gets in a dangerous condition. While on this point we feel it necessary to refer to what one often hears on the subject of overloading in connection with a vessel's register tonnage, especially in reference to grain and coal cargoes. As we have often pointed out in this Magazine, a sailing vessel's register tonnage does furnish a material for an approximation of her safe load; but, in this respect, a steamer's register tonnage is altogether useless. Under the present law for calculating register tonnage, two steamers of, say, 2,000 tons each may be built from the same lines, be exactly alike in every particular both of hull and machinery, and yet if one of them has a small donkey boiler in a recess in the main boiler space, this trifle alone may cause a difference of 190 tons in the register tonnage. One steamer may carry cargo to the extent of twice her register tonnage and be overladen; another might be designed to carry three times her register tonnage and yet be perfectly safe. Nor is the gross tonnage of a steamer of much more use in estimating her safe load, unless we have full particulars of the weights of her engines and boilers and coals; these added to the weight of cargo would give her gross load, which is the only useful quantity to compare with her under deck register tonnage.

Before leaving this part of the subject, we must express our regret that so little has yet been done in the application of scientific principles in the stowage of merchant ships. The stevedore still does his work by Rule of Thumb, and the wonder is, not that so many, but that no more, fatal mistakes are made. In the Royal Navy, since the loss of the *Captain*, it has been the practice to ascertain the stability of every ship before she goes on her first voyage by inclining her, and the weights used, the distance they are moved through, the angle of inclination, and the load displacement of the ship are the data from which her metacentric height is obtained. We hope to see the day when this will be done with merchant ships, not merely before their first voyage, but whenever there is any doubt as to their stability. It need not be done with such exactness as in the Royal Navy, all that is required is a scale of displacement, such as most shipbuilders now furnish with a new ship, the moving of some known weight through a measured distance, and a record of the consequent heeling over of the ship, which might be measured by means of a plumb line from the mast-head.

We do not propose to say anything on the commercial advantages of water ballast, although we think that even now they are not fully recognised.* Till within recent years it has been the

---

* In an able paper read before the Institution of Naval Architects two years ago, Mr. Martell, the Chief Surveyor of Lloyd's Registry, gives figures upon this subject, which must have been often forcibly brought home in the experience of shipowners in the recent bad times. He says :—"I will take first a steamer built for the Mediterranean trade, and costing about £20,000. Such a vessel will make, say, four voyages in a year. As a rule, she would load to a Mediterranean port, thence go in ballast to her grain-loading port in the Black Sea. This vessel would require about 200 tons of ballast, and assuming a moderate charge for dry ballast of 2s. per ton, this would amount to £20, supposing 65 tons per day could be obtained; the detention caused in shipment, at the moderate charge of £25 per day, would be an additional £75, thus making £95. But on arrival at the loading port this ballast has to be discharged; and, by using the steam winches of the vessel, a further expense, including craft hire of about 1s. per ton, or £10, is incurred, thus making £105. By allowing two days detention before the vessel is in a position to take cargo on board, which—especially in a foreign port where

custom to build for the water ballast what is really a tank, girders being attached to the floors of the ship to take the plating forming the upper surface. In some cases the tank has been under the cargo-hold, sometimes under the engine-room, and in order that the stability of the ship should not be decreased by cargo being above the tank, vessels have been built in which the water ballast was carried in a short compartment extending nearly as high as the light water-line. The latter arrangement, however, has not found much favour. Recently a plan of ship construction has become common in which the arrangements for water ballast are utilized to impart strength to the ship, as has long been the case in the Royal Navy. Instead of the ordinary floor-plates there are longitudinal and also transverse plate-frames, an inner bottom being connected to them, and the space between the inner and outer bottom of the ship being available for water ballast. Messrs. Denny, of Dumbarton, have built a number of vessels on this plan, and on the east coast vessels also have been built in which the inner bottom is attached to the floors or other part of the frame of the ship.

Coming now to the second part of our subject, we find that the Merchant Shipping Act of 1876 deals with the question of grain cargoes as follows:—

"22. Grain Cargoes.—No cargo of which more than one-third consists of any kind of grain, corn, rice, paddy, pulse, seeds, nuts, or nut-kernels, hereinafter referred to as 'grain cargo,' shall be

---

craft have to be sought—is not too much to allow, this would increase the expenses to £155. Suppose, now, the steamer to be ordered on arrival, say, off Falmouth, to some port to discharge cargo from which an outward freight could not be obtained, the same process of ballasting, with its attendant expenses and detention, must again occur, as such a vessel, not being a regular liner, would have to proceed, in all probability, to a coal port. This additional cost, allowing 3s. per ton on 200 tons for taking in and putting out ballast, would amount to £30, bringing up our expenses to £185; and, with three days' detention, being another £75, the total cost of expenses, at a moderate calculation, on one voyage would be £260. This taken on four similar voyages would amount to above £1,000 in the year on a capital of £20,000."

carried on board any British ship unless such grain cargo be contained in bags, sacks, or barrels, or secured from shifting by boards, bulkheads, or otherwise.

"If the managing owner of any British ship, or any agent of such owner who is charged with the loading of the ship or the sending her to sea knowingly allows any grain cargo, or part of a grain cargo, to be shipped therein for carriage, contrary to the provisions of this section, he shall, for every such offence incur a penalty not exceeding three hundred pounds, to be recovered upon summary conviction."

When this clause was inserted in the Act, it was foreseen that great difficulty would stand in the way of its enforcement. It appears to be easy enough to fine any master or owner of a ship for not having shifting boards, the awkward point to decide is, what are efficient shifting boards, when the decision has to be come to after the ship has performed her voyage.

A ship may have very inefficient shifting boards, but yet, if the cargo has not shifted, it would be difficult to prove their inefficiency, and, on the other hand, if the cargo has shifted and the vessel has yet been brought into port in safety, through the skill of the shipmaster, it seems unjust to punish a man for want of skill and care, after his having successfully come out of difficulty and danger. At first something was done in the way of surveys, under the direction of British consuls at loading ports, it having been stated very positively, but erroneously, in 1875, that there had been no losses of grain-laden vessels from Canadian or American ports for two years, this period exactly coinciding with the date from which in those countries supervision had been exercised over the loading of such vessels. Chiefly in consequence of this statement, arrangements were made in the latter part of 1875, by which British consuls were empowered to employ surveyors to inspect the loading of grain, and to report upon the subject to the Board of Trade. It being considered that the stowage of grain cargoes is a subject on which the masters of ships should be as well informed as anyone else, and that, in all probability, any surveyors appointed by consuls abroad would be themselves shipmasters, and, moreover, could have no authority to detain an improperly laden ship, it is

not easy to see how any advantage could have been expected from this. It does not appear that any good resulted, and we believe the plan was very soon quietly dropped. It is now, unfortunately, too certain that grain-laden vessels from American ports, where the arrangements for stowage of cargo are inspected, have been lost, and now further legislation is asked to prevent altogether the carriage of grain in bulk. As to the nature of the inspection, we find, by referring to a Parliamentary paper on the subject, that in Canada there is a Government officer, called a Port Warden, who supervises the loading of grain, and directs the use of what dunnage and shifting boards he may consider necessary. In the United States the Government does not interfere in the case, but the underwriters employ surveyors. The New York Board of Underwriters, so long ago as 1860, considered the question, and issued a most admirable code of regulations, which we believe are substantially in force now. The details of these rules are pretty well known to many of our readers, and we shall therefore merely say that they provide for dunnage, for proper lining, for the protection and clearing of pumps, for bulkheads, in the case of large vessels, and for shifting boards extending, when all the cargo is in bulk, from the deck to the keelson. A surveyor visits the ship and inspects all the details of the shifting boards, &c. Ships not insured by New York underwriters, are, of course, not surveyed by their agents, but we believe it is the case that every vessel insured is inspected by some surveyor before she leaves an American port.

We think it is rash in the extreme to conclude that because ships have shifting boards which are surveyed, and yet are sometimes lost through the grain shifting, that shifting boards are useless, and therefore the law should compel all grain to be carried in bags. In the first place, is it certain that the shifting boards are always properly constructed? From what is often said, one would suppose that they are merely intended to prevent a *sudden* shifting of cargo consequent upon a sudden lurch. Almost any shifting board will do this, but we think there is something further to be done, seeing that danger may, and does, result from the gradual flow of grain as well as from sudden movements. To prevent the slow flow of

grain, centre boards are of no use at all unless they extend from keelson to deck; they are of little use unless they are fairly tight. We fear that very few ships, even now, have shifting boards which are really grain tight; until this point is secured, it is premature to say that grain cannot be carried safely in bulk. We think that the best solution of the difficulty in most steamers, would be the building in the ship of a permanent middle line bulkhead, with, perhaps, moveable parts below the hatches only. This would be useful to prevent the shifting of cargo other than grain, would not, in practice, be found to be very much in the way, and would, we believe, altogether cost much less than the frequently recurring charges for shifting boards. In iron ships, such a bulkhead might be so worked in as to impart strength, and allowances might be made in respect of it from other parts of the structure. The law with reference to grain cargoes does not absolutely insist upon shifting-boards; either by using them *or otherwise* grain is to be prevented from shifting. This reminds us of the fact that many steamers have the boards when there is not the least necessity for them. We refer to the case where there is a trunk hatch so large, as compared with the compartment of the hold below it, that it contains sufficient grain to make up for any possible amount of settling. An Act to compel grain to be carried in bags would be very unfair in its application to such cases where there is perfect safety with a cargo in bulk, even without shifting boards. In many vessels temporary arrangements for "feeders" are adopted, and it is certain that, with proper care, they can be made efficient.

We do not hope the discussion of the subject will lead to any legislation; we do hope that it will lead to good in many other ways. There is one thing which is so obvious an evil that it hardly seems necessary to mention it, and that is, the imperfect trimming of the cargo. It is certain that all the vacant space over a grain cargo is not due to settling, much of it must be put down to negligence in loading. We fear that in the modern anxiety of the steamship owner to keep his vessel going, the stowage of the cargo is often unduly hurried, the trimming of coals is scamped, the grain is not shovelled up in the wings, and other cargo is badly packed or imperfectly secured. The law, as

it now stands, holds the shipmaster responsible for the proper use of means for preventing the shifting of cargo, and we may add the law has on one occasion been put in force. In a former number of this Magazine* there is a detailed account of a case where a conviction was obtained under the Act of 1875, a cargo of linseed in bulk having shifted, the shifting boards being inefficient, and no other efficient arrangement having been made.

It has been urged as a reason for prohibiting the cargo of grain in bulk, that the cost of bags would be very trifling, perhaps no more than that of shifting boards; if such be the case, it is pretty certain that bags will come into use, whether there be fresh legislation or not; but if bags are really much more expensive than boards, and if their use is unnecessarily enforced, the extra expense of them will not fall upon the shipowner, but upon those for whose use the corn is imported. In deprecating unnecessary interference on the part of the Legislature with the shipping of this country, we do, in the first place, advocate the cause of the British shipowner, as against his unfettered foreign rivals; this, however, is a small matter compared with the interest of the millions who are dependent for their food supplies upon foreign-grown corn. Unnecessary restriction, involving expense to the shipowner, must be paid for in increased freight, and increased freight falls ultimately upon the consumer.

THE NEW NAVIGATION AND SUMNER'S METHOD.

(*Continued from page* 30.)

Errors of Observation.—It is no purpose of ours on the present occasion to discuss the theory of errors of observation, which is known to the few, though not to the many; we are, however, more especially writing for the latter, and may therefore be permitted to make such cautionary remarks on this subject as we have reason to think will be appreciated. If we admit of no errors in the elements taken from the Nautical Almanac, a very small error

---

* *Nautical Magazine*, July, 1878, page 623.

in the Greenwich time by chronometer, and no appreciable error in the assumed latitudes, there still remain the errors in the altitudes, and these must always more or less effect the determination of the position of the ship. Errors of observation are partly accidental, and partly systematic; some cancel each other, but there must always remain a residue which, however, under ordinary circumstances, and with the exercise of a little judgment and caution, may be considered as a minimum.

There may, possibly, be a slight imperfection, at a particular part of the sextant, in the graduation of the arc; having ascertained this, keep a memorandum of the number of degrees over which it extends, and remember that at a certain spot it will be a maximum, gradually decreasing on either side. As regards the "finding of the index error," ample instructions are given in every work on Navigation; having found it by the "off and on" readings, apply it as an error to the observed altitude; however good a mechanic you may esteem yourself to be, avoid tinkering with the adjusting screws. If you have not habitually used the telescope, do so forthwith, and always be particular as to the adjustment of the line of collimation; also, remember that the more you can narrow the field of observation, the more accurate will be the altitude and the contact between two objects. The shades may always be suspected, and they sometimes give a very large error; but there is little need to use them; for the sun, a dark glass at the eye end of the telescope is preferable, as by this arrangement the rays from the object and the image are alike affected, and the angle between them remains unchanged. When using the telescope you must close the eye not required for vision; with the tube it is sometimes preferable to keep both eyes open.

For an altitude of a star or planet, it is always safe to begin by placing O on the vernier to O on the arc, then, looking at the object, gradually bring it down to the horizon by moving the index onwards; proceeding in this manner, when two or more bright stars are near together, as, for instance, Castor and Pollux, you are sure which star you have brought down.

Assuming that the instrumental errors are known, there yet remains an error which, with some persons, is as great, if not

greater, than any other. We refer to what is usually called the *personal equation*. Being due to a physiological cause—an imperfection in one or more of the organs of the body—the result is a constant retardation or acceleration of an event; in fact, a bad contact is made; and it even extends to an imperfect reading off of the indications of the arc; as such, it is a systematic error peculiar to the individual—essentially his own, which, however, with a little care, can be ascertained and properly applied; in health it is a constant, when ailing it slightly varies in amount, but does not change from *plus* to *minus*, or *vice versâ*.

It is well known that refraction varies at times very considerably; it also produces an effect upon the dip. An unusual amount of refraction is generally recognisable by the sense of sight; but the extent to which it may alter the ordinary "correction of altitude" cannot be determined with certainty. As a rule, whenever the altitude is observed at less than 10°, the mean refraction may be in error more than 1′, and should be corrected by the attached barometric and thermometric tables; for precision, this is necessary in all cases.

It may be taken as generally correct that all systematic errors—those due to the instrument and the observer—are under control, and may be checked; the accidental errors—those due to external causes—are only to be partially apprehended and appreciated. Under ordinary circumstances the errors of observation when taken together (exclusive, of course, of any personal equation) should never exceed 2′ to 3′; they may, from adverse causes, and the state of the weather and sea, amount to 4′ or 5′; when they are produced as the result of an abnormal refraction they may exceed 15′; but in no case can it be certain that an altitude has been observed within 1′.

It has been necessary to say this much, because there can be no doubt that the problem under discussion is destined to take a very important place in navigation; the accuracy of most of the determinations will much depend upon the accuracy of the observations, and hence chiefly, though not wholly, upon the skill and judgment of the observer. Owing to errors in the altitudes, it is certain that the position of a point cannot be ascertained at sea;

but as we may often fix the limit of the errors, we are enabled to describe a quadrilateral figure within which is the place of the ship, and which may at once be aptly described as a surface of position and certitude.

What we want to know is the *position* (latitude and longitude) *of the ship by projection on Mercator's chart*, after having made a few easy computations on the basis of the usual "chronometer problem;" the data being elements, some of which are exactly, and others nearly, correct, and among which are introduced certain assumptions derived from the estimated parallel on which the ship is found to be by the "dead reckoning." The rules, briefly stated, are as follow:—

From an altitude of a celestial body taken at a given Greenwich time, to find the curve of position of the observer by projection on a Mercator's chart.—The circle of position as delineated on the sphere becomes, when transferred to Mercator's chart, a curve of position, which can only be laid down by a series of computed points. For any given altitude you can select any number of parallels of latitude crossed by the required circle. For each of these latitudes, with the true altitude deduced from the observed, and with the polar distance of the celestial body taken for the Greenwich time, compute the time at place, and thence the longitude by chronometer. Each latitude with its corresponding *longitude* gives a point in the circle of position. You may, by way of experiment, compute several (say ten or a dozen) such points for intervals of 30′ of latitude; then, having plotted these different points on Mercator's chart you obtain, by joining them, a portion of the curve of position.

In practice, it is generally sufficient to lay down only two points; for, the approximate position of the ship being known, two latitudes are selected, such that the ship may be assumed to be between them.

To find the Latitude and Longitude of a Ship by circles of position projected on a Mercator's chart.—1. Let the altitudes of *two objects be taken at the same instant.* Assume two latitudes, embracing between them the ship's probable position, and find two points of each of their two circles of position as before stated, and

project these points on the chart, each pair of points being joined by a straight line, the intersection of the two lines is very nearly the ship's position. If the intersection does not happen to fall between the two assumed parallels, then, for greater accuracy, assume another latitude, such that it shall do so; compute and project again. If one person observe both altitudes, it will be necessary, as they are not exactly simultaneous sights, to take the Greenwich time for each observation; if quickly done the small change in the ship's position in the interval will not greatly effect the result.

2. The altitude of the *same object*—as in the case of the sun—may be *taken at two different times*, and the circles laid down as before. When the ship has changed her position in the interval between the two observations, either the usual reduction of the first altitude for change of place must be applied, or—as is more practical—the circles of position for each observation having been projected, the first must be moved parallel to itself in the direction of the course made good, and by a quantity equal to the distance run; the intersection of its new position will give the place of the ship at the second observation.

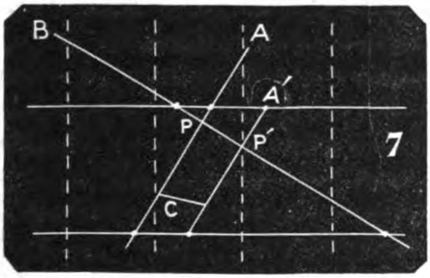


Fig. 7.

In Fig. 7, if we suppose the lines A and B to represent lines plotted on the chart to their respective latitudes and longitudes as derived from simultaneous altitudes of two celestial objects, then the ship being somewhere on A, and also somewhere on B, the intersection of the two lines at the point P at once determines the position.

But in Fig. 7 if, as in the case of the sun, where there has been an earlier and later observation, with a course and distance run in the interval, we, as before, project a line A as that on some part of which the ship is supposed to be at the time of the first observation; and B the line as derived from the second observation;

then, from any part of the line A we must also project the line C equal to the course and distance; from the extremity of C draw a line A′ parallel with A; and the intersection at P′ of the two lines A′ and B determines the position of the ship at the time of taking the second observation.

A single altitude of a celestial object at any given Greenwich time, with its polar distance and two assumed latitudes, determines the elements for a line of position A, which is plotted on the chart according to the respective latitudes and longitudes; if the data are correct, A is unquestionably a line on some part of which is the ship; if the altitude is assumed to be doubtful to the extent of 2′ or 3′, in one direction or the other, this can also be shown. When the altitude is too *small*, the hour angle is too *great;* when the altitude is too *great*, the hour angle is too *small*. Hence, by projecting the lines *a* and *a′* (Fig. 3), one on each side of A, and parallel with it, and to the extent of the error of altitude, we get a *zone*, or linear space, bounded by the lines *a* and *a′*, *within* which it will be safe to assume the ship's position to be.

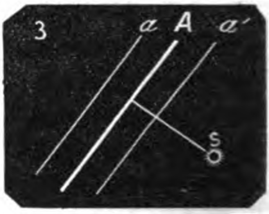


FIG. 3.

If the altitudes of two objects have been taken at the same time, then, assuming the data to be correct, we at once determine the point by the intersection of the lines of position A and B (Fig. 4); but if, as in the case of A, the altitude which gives B is also doubtful, we project as before the lines *b* and *b′*; we thus get a space, indicated in the figure by the shaded quadrilateral, and which is determined by *a a′* in one direction, and by *b b′* in the other. Within this space is the ship's position, and the area of the space is naturally more circumscribed than either zone. If we now assume a small error in the chronometer, we can delineate it around the quadrilateral; but as

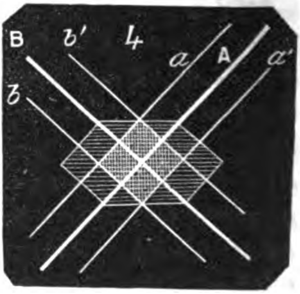


FIG. 4.

this gives no error in latitude we get a figure of a different form—a hexagon, which determines the limit of error of the point, and gives an area or surface of certitude within which lies the ship's position.

When the azimuthal angle between the lines of position is 90° the form of the quadrilateral will be that given in Fig. 4; it will change its outline considerably for smaller or greater angles; its area, nevertheless, defines the limit of error, though the exact position of the point within it is unknown (*see* also Fig. 6, p. 115).

A position obtained by two altitudes, with an interval of time between the observations, is affected to the extent of the errors in the "dead reckoning" during the interval, and by errors in the altitudes. Let us assume an error of a quarter of a point on the course, which produces an error of one mile in twenty; 1′ on each altitude; and the chronometer doubtful to about 5 or 6 seconds. In Fig. 5 we have the line of position A (together with *a* and *a*′)

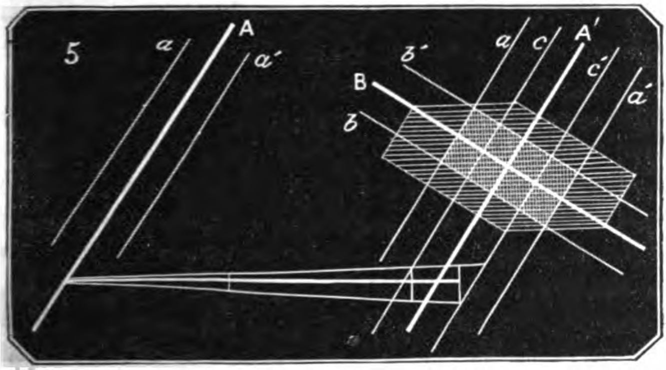


FIG. 5.

as the result of the first altitude, and B (together with *b* and *b*′) as the position line for the second altitude. If the course and distance be correct, A transferred to A′ gives, by its intersection of B, the point where the second observation was made; but A and B have each an error, which, developed near the point of intersection, gives a small quadrilateral, easily recognised by the reader.

The distance run may, however, be 19 or 21 miles, due to the

error on the course; this one mile projected on each side of A′ gives the zone contained between *c* and *c′*; but, since *c* and *c′* are the representatives of A, we must reproduce *a* and *a′* outside of *c* and *c′*. Thus the quadrilateral (the light shaded portion of Fig. 5) defined by the zone *b b′* in the one direction, and by the zone *a a′* in the other, becomes the space or area within which the ship's position may possibly be. If we now carry the quadrilateral bodily to the east and west $1\frac{1}{2}'$ for the error of the chronometer, we, as before, obtain a hexagonal space definitively limiting the position of the point. Each of the geometrical figures will be small or great, in proportion to the errors in the data, concurrently with the azimuthal angle between the lines of position. In Fig. 5 the ship *may* be at the intersection of A′ and B; it may also be at any part of the quadrilateral, or of the hexagon. But where there are so many errors of different kinds as those we have now taken into account, since some are likely to be of one character, and some of another, it is just possible, but very improbable, that they could be accumulative in any one direction; hence Fig. 5, which, from the various errors delineated, looks so very formidable, may be considered to define the ship's position, not within eight or nine, but within four miles.

The position determined by simultaneous altitudes of two stars, if the angle at the vertical is good—and this is a mere matter of selection—can only be affected to the extent of the errors of altitudes and those of the chronometer; and the navigator should never lose an opportunity of observing them.

It is evident from the nature of the projection that the most favourable case for the accurate determination of the intersection is that in which the lines of position intersect at right angles. Hence the two objects observed, or the two positions of the same object, should, if possible, differ about 90° in azimuth.

We give below, in miles, the greatest errors likely to arise on the point, for different values of the errors of altitude at different angles of the intersection of the lines of position.

Error of Altitudes.	Angle of intersection of lines of position.						
	90°	75°	60°	45°	30°	20°	10°
′	m.	m.	m.	m.	m.	m.	m.
1	1·4	1·6	2·0	2·6	3·9	5·8	11·5
2	2·8	3·3	4·0	5·2	7·7	11·5	22·9
3	4·2	4·9	6·0	7·8	11·6	17·3	34·4
4	5·7	6·6	8·0	10·5	15·5	23·0	45·9
5	7·1	8·2	10·0	13·1	19·3	28·8	57·4
	90°	105°	120°	135°	150°	160°	170°
	Angle of intersection of lines of position.						

A reference to the Table shows that an error of 1′ in the altitude will produce an error of position on the earth's surface equal to at least 1·4 miles, even when the azimuthal difference of the lines is at its best (90°). When the angle is very small or very large, the error is proportionally greater; and the latitude and longitude will be more or less affected accordingly, the latitude most by observations made when the object is near the prime vertical, the longitude most by observations taken near the meridian. Fig. 6 will illustrate this: B and A are lines of position projected for observations on each side of the prime vertical, with an azimuthal angle between them of about 30°; if both altitudes are correct, the intersection of B and A gives the correct position. For altitudes with equal errors—each too great and too small—the shaded quadrilateral defines the space within which must be the ship's position. If both altitudes are equally too great or too small, the ship may be at the outermost part of the quadrilateral, to the right or left. If one altitude is too great, and the other equally too small,

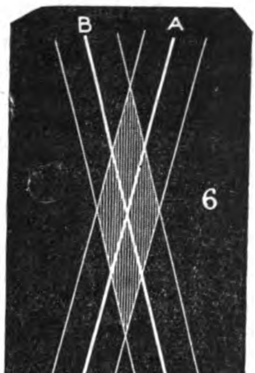


Fig. 6.

the ship's position may be at the uppermost or lowermost part of the quadrilateral; in which case the latitude will be most in error, and is likely to be so, for the observations having been made with

the objects near the prime vertical, the longitude will, under such conditions, be but little affected.

If you now turn the page top to the side, and look at the Fig. with its length trending to the right and left, you will see that the lines of position, B and A, indicate that the observations were made when the objects were on different sides of, and not far from, the meridian,—the azimuthal difference being as before 30°; in this case the longitude is much more likely to be affected than the latitude, and to a greater extent; but the quadrilateral still defines the space in some part of which is the ship, and it will continue to define it in whatever intermediate direction you turn the Fig., and though the latitude and longitude undergo change.

(*To be continued.*)

NOTES ON THE MARITIME DEVELOPMENT OF JAPAN.

MYTHOLOGICAL obscurity enshrouds the very early history of Japan. The writings of native authors are throughout tinged with the marvellous, containing many allusions to "Divine ancestors" and mythical events and personages.

It is, however, possible to gather here and there isolated facts which give some indication of the progress of Japanese shipping, and lead up to the period when European relations with the "Land of the Rising Sun" became more intimate and settled.

Japanese annals show that several centuries antecedent to the Christian Era, ships arrived from distant southern countries and from the adjacent mainland of Asia. It is recorded that about 250 B.C. the Emperor of China sent over to Japan for the "Elixir of Immortality," and that subsequently a warlike expedition was despatched from the mainland, and was destroyed by a typhoon. Native annalists also state that about 81 B.C., during the reign of Sujin, ships were first built in "Dai Nipon."

In the early centuries of our Era the Asiatics were great travellers, the propagandists of Buddhism especially; and Japanese

went to China, and even to India, to study the classics of the former and the religion of the latter. Warlike expeditions were frequent, and ships from far off countries arrived; the coast trade was considerable, and vessels of (for the time) large size conveyed warriors, rice, horses, and even elephants, to and fro. The Arabs in their ships had reached the China coast, and had considerable trade, as well as a firm footing, at the places frequented by Japanese, especially at Canton; and the Japanese came in contact with them and also the Nestorians, some of whom voyaged in Arab ships to China. Japanese raids on the coasts of the Asiatic continent appear to have been frequent, and were much dreaded, so much so that at one time a long line of coast was abandoned, and subsequently fortified before re-occupation. In the time of Polo (end of 12th century) an attempt was made to subdue these daring islanders, but again an armada despatched for the purpose was destroyed by a tempest.

When the Portuguese reached Japan, shortly after their gaining a footing in China, early in the 16th century, the Japanese had a numerous mercantile marine, and ships of large size.

Shortly after the advent of Europeans, efforts were made by the Japanese to improve their seagoing craft, and Will Adams, the Englishman, in the beginning of the 17th century, seems to have been detained for that purpose; his home in Japan is now the site of the great arsenal of the North Pacific.

But this movement appears to have been of brief duration owing to the alarm caused by the attempts of foreign missionaries to introduce Christianity into Japan. To check the spread of Christian beliefs the severest measures were adopted. All foreign missionaries were summarily expelled, their converts put to death, and from about A.D. 1634, Japanese travel and foreign intercourse were entirely prohibited, and a decree was issued against "three-masted vessels," its details defining the form and size of ships that alone should be built. Japanese ports were closed to all foreign vessels, and a system of the most rigid exclusion was maintained for more than 200 years. It is probable that during this "close" period, maritime matters slept; but in the year 1853, Commodore Perry, of the United States Navy, steamed into Yokohama with a

squadron of war-vessels, and gave the nation a rude awakening. A treaty was extorted by the enterprising American officer in favour of his country, which was quickly followed by treaties with other countries, including Great Britain. This change was productive of the most important results; the Japanese becoming aware of the power, wealth, and resources of the despised Western nations, were stirred into the activity of emulation, and some of the more powerful provincial rulers attempted the construction of ships on more approved models. The Tokugawa Executive utilized the wrecks —that of the *Diana*, at Simoda, for one—in the building of vessels on foreign models, thus evading the strict letter of the prohibitory decree.

In 1857, the Netherlands Trading Association presented the Yedo Government, in the name of the King of Holland, with a small wooden paddle-boat, built at Flushing, in 1856, and Great Britain followed with a small wooden gunboat. The Dutch obtained an order to build three iron steam-vessels, for which they had, subsequently, to come to England. These were the first of the "Navy of Japan." In 1861, the Chief of the Satzuma purchased the *England*, a ship-rigged screw of 746 tons register, built at Glasgow, in 1856, for 128,000 dollars (Exchange being about 4s. 9½d. then); this was the beginning of the "Provincial Marine."

Being now thoroughly smitten with the fever of progress, the Japanese eagerly purchased ships of all kinds, and it is not surprising to find that in so ready a market many steam-vessels were sold to the Japanese because they were no longer profitable to their foreign owners; not worth, in many instances, new boilers and other necessary repairs, and, without exception, "coal eaters." Three "90-day" Yankee gunboats, some obsolete P. & O. Mail steamers, and several large and very old wooden U.S. Pacific Mail beam-engine boats being amongst these. Up to December, 1863, besides those purchased, there arrived for, and awaited sale—Screw-steamers:—British, 12; American, 3; Russian, 1; various, 5—total, 21. Paddle-steamers:—British, 8; various, 2—total, 10. Sailing vessels:—American, 2; British 3—total, 5; making a grand total of 36 vessels; and a hundred others were offered, but did not cross over to Japan. Every foreigner became a "ship-

broker," and more than one "missionary" and consular official attempted to profit by the trade. Altogether, upwards of eighty vessels, in various stages of efficiency, were purchased by the Japanese Government for their mercantile marine.

The Yedo Executive had for some time regarded the opening of the country as an approaching possibility, and made some preparation for coming events. A number of Japanese had received instruction in navigation, &c., from the Dutch, and some were sent to Holland to be taught there.

The Provincial Governments had no such advantages, and as it will be seen that they were purchasers of all but a very few vessels, and foreigners were not permitted to manage them even if wished for, the natives had to learn how to use the vessels after they had purchased them. It is thus easy to understand that for some years these vessels were a source of great expense, and of little use; mismanagement and ignorance caused wrecks and damage to machinery, boilers, &c., entailing large expenditure for repairs, and the natives were being continually imposed upon in consequence by "contractors," &c.

After the change of Government, in 1868, foreigners came to be more generally employed as navigators and engineers. Some of these men were competent and conscientious, but the majority were unmistakeably "black sheep," and disgraced their countries and calling. The natives, consequently, had a very bad example shown them during the past ten years; so need it be wondered at that the native officers and crews are not everything that a well-wisher of Japan could desire.

Japanese make fairly good sailors and firemen, although foreigners have not been always fortunate in those shipped. Many young men went to sea in foreign ships to learn, and were not over zealous about hard work and "dirty jobs." The majority of the crews of the foreign-built ships were of a class that, while considering themselves above the artizan and trader, yet could not attain to the higher grade; a middle class, having all the faults and few of the virtues of both; many of them truculent, idle fellows, that would have been more in place on board of the war-ships, if sent to fight the Chinese especially.

Discipline was most lax. The captain, not having, as a rule, professional knowledge or experience, was quite at the mercy of his men; and latterly, when he had a foreigner employed as navigator, devoted his attention to his private interests. On trivial excuses the vessel would stop at out-of-the-way places, and every available space would be filled with cheaply purchased commodities, even firewood, if nothing better was attainable.

Each captain chose his own crew; the foreigners would have very little voice in the matter, and the men were paid monthly, finding their own rations. Sometimes the captain or his factotum would provide the mess.

In the spring of 1871 the writer drew up rules for the first navigation company of importance established, "The Kaiso," subsequently entitled, "Imperial Japanese Mail Service," which was later on altered to "National," and he endeavoured to induce the government officials to exercise some control over the natives, and enforce the adoption of some system of shipping, discharge, and rating of officers, men, &c. As an inducement to the Naval Department to support his views, he proposed the establishment of a Naval Reserve, "so that the merchant service might be utilized as a school for the numerous men that would be required to man the ships proposed to be built in the country, or purchased abroad; but private interests and individual ambition interfered with the adoption of any system, the Formosan expedition in the spring of 1874, internal serious disturbances, and other causes, tended to postpone any scheme being adopted later on.

The first company had taken over from the central government, at a valuation, a number of the vessels which had been the property of the provincial governments, and failing to obtain a subsidy, found it most difficult to keep the ships running; heavy outlay for coal, for repairs, and for foreign captains and engineers' wages, absorbing the bulk of the earnings, which were further reduced by bad management at outports, and dishonest captains, supercargoes, and agents.

The exigencies of the Formosa expedition caused several vessels to be chartered, and others to be purchased by the Government in 1874; and a provincial company, supported by several influential

Government officials, obtained the management of these ships; this semi-official combination attained the desired subsidy; and, moreover, increased the fleet with Government aid.

The steamers of the branch line of the United States Pacific Mail Steamship Company, old wooden side-wheel walking beam engine vessels, of over 2,000 tons, were purchased in 1875, and the line withdrawn; the American Company fortunate in being rid of them, the natives proud of their new, though costly mail service. With these were subsequently included some of the best vessels of other private companies; and, in 1876, the original company was also absorbed in its successful rival.

The Postal Department now took charge of the Mail Service; and, under an energetic native chief, a school was founded, and foreigners employed both afloat and ashore to a very large extent.

C. PFOUNDES.

(To be continued.)

ATLANTIC GRAIN TRADE.

(Communicated.)

ATTENTION having been attracted to the number of steamers lost in the Atlantic during the previous year, most of them loaded with grain, conjecture has been busy as to the probable cause of this. Improper stowage, insufficient propelling steam-power to keep a-head of the sea when running in a gale, model of vessel unsuited for the particular trade, weight of cargo improperly distributed, fore-and-aft sails for steadying the vessel either too large and very slightly roped, or made of canvas too slight for the purpose, insufficient pumping gear, with a crew of deck hands too few in number to cope with a serious casualty,—all or each of the above, in addition to the severe gales and heavy seas of the Atlantic, may have been conducive to the many serious and lamentable losses.

Before steam-vessels became general, the Austrian sailing vessels from the Black sea were celebrated for delivering grain cargoes in

bulk in good order. Their ceiling was all caulked and payed, air holes all properly blocked up; the pump casing was not only dove-tailed, but tongued and grooved, so that it was impossible for grain to get into the limbers. A rose cap was fitted on the lower end of the pump, in addition to the outer square perforated metal box in the pump well, while their shifting boards double, one on each side of the stanchions, extended from close up to the under part of the upper deck to the lower hold beams, and was shored up on both sides with rickers. The shifting boards were continued the whole length of the between decks where grain was stowed.

Most sailing vessels, before loading grain in bulk, used to divide the hold by a bulkhead, at the fore part of the fore-hatch down to the ceiling. The fore part was not filled up to the deck like the main-hold, for two reasons. The first was the trim of the vessel, and the second, that in the event of the grain settling in the main hold, grain could be passed through the forecastle from the fore-hold to fill up the main when opportunity offered. The grain in the fore-hold, which was never filled right up, was covered with sails, and the spare ropes and hawsers coiled on top of it. This kept the grain from shifting. The sail was necessary, as it was found that articles placed on top of wheat, without a preventive, would find a way to the bottom of it, probably from the motion of the vessel at sea. This we know from experiment with an iron gin, a shovel, and an empty cask, and from the above we are inclined to believe that grain in bags stowed on the top of grain in bulk would do the same, unless the latter were boarded at intervals, having sails or good large mats underneath.

Some of the Greek as well as the Austrian vessels, in addition to the above precautions, used to have a deck plank, fitted to take out, for the purpose of filling up the main-hold; this was midway between the hatchway and covering board, and extended to three or four beams. These vessels had the advantage (impossible in the Atlantic trade) of going into Malta, and Gibraltar when necessary, and filling up their main holds properly before getting into a very heavy sea-way.

One of the most dangerous vessels when running in a heavy gale is a large, loaded, brig-rigged steamer; in the event of a break down

in the steering gear or machinery, or shipping a sea which puts the fires out, what is to prevent her wallowing in the trough of the sea till her hatches are most probably stove in, and the vessel swamped? There is nothing on which after canvas can be set to keep her shoulder to the sea. A barque rig, with a jib-headed trysail, made of storm canvas, and roped in proportion, set on the mizen-mast, would, in all probability, enable her to live through a gale in which she might otherwise founder. A steamer which had it ready bent and prepared to set the moment it was required would possess a decided advantage over one not so provided.

The clinker laid boarding or lining used at the side of the lower hold of steamers loading grain in bulk in America, is objectionable. It extends from the deck above down to the solid ceiling. Between it and the side of the vessel there is a space the depth of the vessel's frames and spar ceiling. In the event of this boarding cracking with the motion of the vessel at sea, or being gnawed through by rats, the grain running into the vacant space would lower the upper surface of the grain to an extent that would give a vessel a dangerous list with the wind and sea a-beam.

Much is being said and written about the models of steamers employed in the Atlantic trade from the east coast of England. There can be no doubt that a number of them would be better adapted for the trade with more beam and less depth. An inspection of the midship section of some of them would convince any one acquainted with the subject, that, with a grain cargo loaded in bulk, the centre of gravity would be too high for much pressure on the beam or heavy rolling.

Building a steamer specially for carrying grain in bulk across the Atlantic in the winter season is not likely, as she would be unfit for general purposes. Should it be done, the shifting boards ought to be in the form of a fore-and-aft iron bulkhead from the upper deck to the hold beams (we are speaking now of a single-decked vessel) and the hatchways not in the centre but at the waterways, one on each side of the deck for each hold, the same as adopted in the steamers of the Pacific Company. The above plan would enable the holds to be better filled up than the custom now in vogue, and lessen the liability to shift. Why carry grain

in bulk at all? The cost of bags should fall on the shipper, the same as the packing or bagging of other goods—rice, for instance. Wheat from India is shipped in bags at the expense of the exporter. Underwriters could soon enforce this, as also the employment of vessels with sufficient steam-power to keep a-head of a heavy sea when loaded.

The adoption of the Plimsoll load-mark has done much good, but has led to as great an evil as overloading, viz., the probability of a steamer breaking in two halves. A steamer is loading with cargo in abundance, but of a heavy nature; the side bunkers are filled with coals, the thwartship bunker is left unfilled, and the loading proceeds till the vessel is down to the Plimsoll marks; then the vessel proceeds to sea with a space in the middle of her, sometimes a twelfth of her length and the whole of her depth, with not more than a hundred tons of coal in it. On one side of this nearly empty space is the side-bunker coals, boilers, engines, cargo aft, and a heavy cargo on the fore-side. It can, therefore, be no cause of wonder if the vessel is strained and suddenly disappears either on that or some following voyage. If the cargo be *light*, the midship bunker is filled up with coals, and all is correct as regards the distribution of weight. With a *heavy* cargo, the above will most probably be the result.

The steamers of the large companies are generally all that could be desired, but in the late bad times for shipping generally, in the way of low freights and scarcity of cargo, it is not to be wondered at that the smaller vessels take risks they would otherwise shrink from. Competition being so keen, they have to compete with foreign steamers in addition to those under our own flag, and steamers are consequently despatched wherever a paying freight is obtainable, and to reduce expenses as far as possible in every way. In the face of this it is not surprising that steamers should be in demand that have the *largest* possible carrying with the *smallest* possible steam power—their sea-going qualities often being a minor consideration. In this mechanical age, too much reliance is often placed on the engineer and shipwright, while the opinion of those on whom they must all fall back (in the event of anything going wrong at sea), viz., the practical seaman, is at times totally

disregarded. As regards rig, sails, boats, warps, and deck gear generally (and these are too often the weak points in steamers), the opinion of the seaman is preferable to that of the mechanic. Vessels in the Atlantic trade are exposed to a danger difficult to avoid, and which, if possible, ought to be put a stop to, viz., crimping. On arriving at a port in America, "boarding-house runners" put in an appearance, and in most cases succeed in enticing a large portion of the crew to desert; and the substitutes, which can only be obtained through them, are in nine cases out of ten the reverse of seamen. This is far from desirable with the prospect of a winter passage. It is fortunate to be able to get two able seamen in a watch.

With few exceptions, the majority of steamers rarely have their sails (particularly their fore-and-aft ones) roped stoutly enough to stand a severe gale. Holes for the balance reef-points in their trysails are rarely to be found even in the main-trysails on board those long brig-rigged steamers, where a seaman would naturally look for and expect to find them. No doubt can exist in the minds of many seamen who have sailed in vessels of this description, that, if the log-books were examined, ample evidence would be found to confirm the opinion that the "brig-rig" is a mistake for a long steamer likely to encounter heavy weather.

If not barque-rigged, they ought to be three-masted, in order to give them a chance of heaving to with some hope of safety in a heavy sea and gale when the machinery breaks down.

Those who have experienced the benefit of jib-headed storm-trysails in very heavy weather cannot speak too highly in their favour.

STEEL SHIPS.

THE following article we reprint from the *Times* of 20th January. In great measure the substance of the paper has already appeared at different times in our pages, but as a convenient and interesting summary of the progress made in the development of steel for shipbuilding purposes, we think it is well worthy of being preserved in our Magazine, both for its immediate importance and for purposes of reference hereafter.—ED. *N. M.*

"There are few applications of steel that are likely to command more consideration in the immediate future than that of ship-building. Steel ships are not a new thing. They have been more or less before the world for upwards of twenty years. But it was not until a few years ago that the use of steel for this purpose was attempted on a scale sufficiently large to give anything like an adequate idea of the advantages, or otherwise, secured by its adoption. The earliest applications of steel had no regard to the question of economy. Their main purpose was that of obtaining increased speed and a shallow draught, and this was got by the greater lightness of the material. For these purposes steel was employed as far back as 1852 in the construction of vessels designed to navigate the Rhine. Two or three years later a steel punt was built for the navigation of the Zambesi by Dr. Livingtone. Between 1857 and 1860 a large number of vessels were built of the same material with a view to navigating shallow waters in India, Russia, Germany, and England. During the American war, also, many vessels were built of steel to run the blockade. But in all these cases the difference of cost entailed by the substitution of steel for iron was enormous. Even in 1858, two years after the Bessemer process was first brought before the world, as much as £50 per ton was frequently paid for steel plates, which was more than treble the cost of iron. Nor were the early steel ships in all cases as successful as their builders anticipated. Dr. Livingtone pronounced the use of steel in his own case to be an utter failure, and took care to inform the world of the fact through

the Society of Arts. In other cases, the application of steel was looked upon as more than doubtful, corrosion on the one hand and high cost on the other rendering it quite the reverse of economical. Now, however, steel manufacturers have placed at the disposal of shipbuilders a very different quality of material, and at a very different cost. In some recent contracts for vessels to be constructed of open-hearth steel, the material has been purchased as low as £10 10s. per ton, which is less than half the lowest price paid for steel plates only ten or twelve years ago. Manufacturers have, moreover, applied their energies to the production of a metal specially adapted to shipbuilding—a metal so mild as to bend rather than break in case of a severe strain, and yet possessing a higher tensile strength than wrought iron. With such a metal approximating iron in first cost, and with lighter scantlings sanctioned by both the Board of Trade and Lloyd's Register, steel would appear at first sight to have everything to recommend its adoption. It has still, however, to redeem not a few past failures. It has not, so far, proved its superior endurance. It is believed by many to be more liable to corrosion and exfoliation than iron, and shippers are still accustomed to look with apprehension upon any reduction of the thickness of ship plates, lest it should cause a greater liability to 'buckling' in the case of such a strain as that recently endured by the *Arizona*. On the other hand, however, the advantages offered by steel are so manifest that many important shipowning firms have given it an avowed preference. The Cunard, the Allan, the Pacific, and other leading lines are now using steel in the construction of vessels upon the safety and soundness of which thousands of lives will be daily dependent. Such being the position of affairs, it becomes of great moment, not only to the owners and builders of vessels, but to the general public, who must commit their lives and their property to the new material, that the relative qualities of iron and steel and the probable results of the general use of the latter should be better understood.

"Obviously, the first consideration that arises in dealing with the substitution of steel for iron is that of its suitability. Within the last few years a great deal has been done in the way of determining this question. The answer may be said to be already

at hand in the more extended application of steel not only for plates, but for angles and rivets as well. Mr. Barnaby and others have found that steel plates have cracked and fractured in a mysterious way; and it is still largely an open question whether this is due to the manufacturer or to the carelessness of the workmen employed in the shipbuilding yard. Manufacturers, of course, allege that the fault lies with the latter, and this is confirmed by the experience of Lloyd's surveyors and other authorities. It would seem thus to be established that in the treatment of steel plates a greater amount of care and skill is necessary than is called for in dealing with iron, and Mr. Barnaby has expressed the opinion that so long as this additional care is requisite it would hinder the adoption of steel angles for the frames of ships. It is also still a moot point whether steel is more liable to corrosion than iron. Experience on this matter has been extremely conflicting; so much so, indeed, that scarcely any two authorities are exactly agreed as to how far liability to corrosion will affect the life of steel ships. Mallet's experiments, as reported to the British Association in 1842 and 1849, accorded to iron a greater power to resist corrosion than steel. The same conclusion has been arrived at by the Admiralty Boiler Committee, who find that 'under ordinary working conditions, mild steel corrodes by pitting, and in a general manner, much more rapidly than wrought iron both in fresh and in salt water.' Others, however, have arrived at quite opposite results. At Terre-Noire, in France, experiments extending over about three years, are said to have established the fact, that when exposed to the action of sea-water, mild steel suffers from corrosion only in the proportion of 60 to 140 when compared with iron plates. Many of the first vessels built of steel have confirmed this result more or less emphatically. One vessel, constructed in 1859 for the Pacific Steam Navigation Company, was examined in 1874 and found to be in an excellent state of preservation, and experiments made on the Camel at Portsmouth have proved that, while the steel is more corroded and pitted at points of the surface, the iron is uniformly rougher. It is probable that the singularly conflicting results obtained have been due to differences in the conditions of treatment—such as the tempera-

ture, the chemical composition of the metal, the extent of the corroding agent having access to the plates, and the length of time over which such exposure takes place. But after due allowance has been made for the doubt and difficulty that still attach to such important questions as that of corrosion, the advantages of steel become less equivocal. Such an access of ductility and tensile strength is secured by the use of that metal that Lloyd's allow a reduction of 20 per cent. in the thickness of the plating and frames of steel vessels. Up to the present time, open-hearth steel appears to have been largely preferred to Bessemer for shipbuilding purposes, because the process is such that by continually sampling and analyzing the metal uniformity can be absolutely depended upon. Bessemer steel, however, is much more generally employed than it was, and authorities—including Lloyd's surveyors—have affirmed that both descriptions of steel may now be absolutely depended upon. The tensile strength of steel plates is about 30 per cent. greater than that of iron; they are much less liable to be distressed by punching closely-spaced lines of rivet-holes; and, as they are equally strong both crosswise and lengthwise, instead of having their strength, like iron, in the direction of the fibre only, they are obviously more to be depended upon. In France the Government stipulate that steel for shipbuilding shall have a tensile strength of 30½ to 31½ tons each way, with 22 per cent. of ductility; Lloyd's stipulate that shipbuilding steel shall have an ultimate tensile strength of not less than 27 tons, with an elongation corresponding to 20 per cent. on a length of eight inches before fracture; while the Dutch Government stipulate for a tensile strength of 27 to 31 tons. Many authorities, however, consider these limits much too low, and leading manufacturers of this country have urged that the proper limit might be raised to 32 tons without any danger of obtaining brittle plates, so long as the temper and other tests are enforced. The absence of lamination, peculiar to steel plates, is another advantage over iron, the surface of the plates being so smooth that not half the labour is required in scraping, cleaning, and painting after they have been fixed in their places.

"The economy to be obtained by the use of steel is another

matter of much concern to both shipowners and shipbuilders. In a steel vessel built on the Tyne about two years ago for the Bilbao trade it was found that the extra cost involved by the substitution of steel was 7½ per cent., and against this there was an extra carrying capability of 84 tons. Since then, however, steel plates have fallen considerably in price. There would seem, indeed, to be no good reason why steel plates should not come as near the price of iron as steel rails have done to the cost of iron rails. As the demand increases so will the supply, and with a greater area of competition prices will certainly fall. Already, indeed, the demand for steel plates has reached in the United Kingdom an aggregate of over 80,000 tons a year, although their production has been limited to about half-a-dozen works. But so confidently do manufacturers anticipate an access of demand that in Scotland, in the north of England, in Sheffield, and in Wales, provision is now being made for extending the means of production. In the Cleveland district the Consett Iron Company, heretofore, perhaps, the largest manufacturers of shipbuilding iron in the world, are adopting the open-hearth system of steel manufacture, and are likely to make as great a mark with the one material as they have already done with the other. It has been calculated by a high authority that the additional cargo-carrying capacity provided for in a steel vessel will exceed 25 per cent. on the additional outlay entailed by the higher price of the material, or about 2 per cent. on the whole cost of the vessel. Experience has amply proved that steel is much more durable for railway and other purposes than iron, there are, however, no similar *data* available concerning the relative life of steel for shipbuilding. There are iron vessels now afloat that have been in service for over thirty years. No steel ship has been afloat for an equally long time. Even so, indeed, the means of a comparison would still be incomplete, seeing that the quality and suitability of the steel employed twenty years ago differed greatly from that of the steel now available. But it is fair to assume that the life of steel ships will considerably exceed that of iron, having regard to the ascertained superiority of steel for other purposes. Nor does the advantage of the new material end here. The greater lightness of steel

will enable voyages to be made with greater speed—so much so, indeed, that authorities whose opinion is entitled to weight confidently expect to find the Atlantic passage brought within seven days. All things considered it is highly probable that steel will henceforth have almost entire possession of the field as a shipbuilding material, and, now that its claims are fairly recognised, will supersede iron as rapidly as that material has already taken the place of wood. In both directions the extent of the change accomplished is less known than it ought to be. So recently as 1850, out of a total tonnage of 133,695 tons of shipping built in the United Kingdom only 12,800 tons were of iron. Ten years later, 64,699 tons, out of a total of 211,968 tons built, were of iron; and ten years later still about 272,000 tons were built of iron as against less than 100,000 tons of wood. In 1878, however, over 400,000 tons of new iron shipping were launched in the United Kingdom, while wood has almost disappeared altogether. The tonnage of iron ships built in the United Kingdom since 1869 has been 93 per cent. greater than in the period 1860-68. There are no figures to enable us to judge of the extent to which steel has already displaced iron; but it is tolerably well-known that steel vessels are at this moment being built in almost every shipbuilding yard in the United Kingdom, that shipbuilders and shippers alike are evincing a preference for its use, and that its further application is only limited by the means available for producing the material. It is manifest that one effect of the more general use of steel must be that of limiting the quantity of material produced. To construct 400,000 gross tons of shipping will absorb over 300,000 tons of iron, but of steel 20 per cent. less would be required; and when to this diminished tonnage of material we add the presumably longer life of steel ships, the conclusion seems justified that shippers rather than manufacturers and shipbuilders will profit by the change."

LITTLE PROBLEMS FOR YOUNG OFFICERS.—No. II.

LET A and B be at anchor as before, and let C be a steamship as before, lashed alongside of B. This time, however, we are only intending to refer to B and C. B is at anchor, the current is ten knots, and there is no wind. The current runs as before from N. to S. B and C will of course head N. C is of the same gross tonnage as B, and of the same form. In fact B and C are sister ships, both steamers. B remains at anchor; but C having got up her steam, casts off from B, and exerts just so much power in her engines as to stem the tide and to keep heading N and a-beam of B. What will be the difference between C and B in their relation to the current, and how must the current be regarded in reference to each ship? Is it to be regarded as a force acting on one of them only, or on both, and if so, does it act on both in the same manner, or does it not?

In the answers to the first problem the current is regarded as a force acting on C.

Amongst the answers as yet received to No. I. Problem there are two correct, viz., those from Fred. C. Green, and H. F. Holt. The answers and demonstrations of the latter are very good and complete.—ED.

[*All answers should be addressed to the Problem Editor, "Nautical Magazine,"* 15, *Great Queen Street, Lincoln's Inn Fields, W.C. Those who answer the whole Six correctly will receive a written testimonial or certificate. We trust that some of the older members of the profession will encourage the sending of answers to these problems.*—ED.]

OFFICIAL INQUIRY.

LOSS OF THE BRITISH MERCHANT STEAMSHIP "BARLEY BARREL," 5TH NOVEMBER, 1878.

THIS case was heard at the Mansion House Banqueting Room, in the Borough of Mudford, on the 31st November, 1879 (upwards of a year after the casualty), and as it was a typical case raising many important points, our own special reporter has recorded it for the benefit of our readers. The Court consisted of several justices, and five assessors, two of them from the Royal Navy and three from the Merchant Service. It would appear from the statement of the learned gentleman who opened the case, that the vessel was bound from the Pitcairn Islands with a cargo of Siberian lentils in bulk; that the vessel was nearly new; that she was staunch, strong, tight, and well-found in every particular, &c., &c., &c. She was 340·7 ft. long, 32·2 ft. in the beam, 30·7 ft. in depth of hold. She had a top-gallant forecastle, and a poop or break-deck, and was fitted with double bottom, and water ballast arrangements. She was classed 1,000 A1 at Lloyd's, and 27 years and 7½ months, in red, in the Liverpool Book, as fit and proper to carry any and every description of perishable cargo, from and to every and any part of the world. Her gross register tonnage was 2,145$\frac{17}{100}$. Her engines were of 219½ horse-power, and she carried 5,702¼ tons of Siberian lentils in bulk. She had two boats, two compasses, the usual chain cables, and was steered by hand from amidships. She carried the usual signals of distress, and five deck hands, besides engineers, firemen, and a cook. She had been reported as "missing" for some months, when the good news unexpectedly arrived that her master, officers, and crew, who had taken to their boats, had been picked up, almost starved, by one of the new Chinese gunboats, on her voyage out from this country, and taken into Hong Kong. It was, in this case, fortunate that these survivors were spared to narrate, though not by any means to account for, the singular circumstance that such a well-built,

highly-classed ship, as was the *Barley Barrel*, should have disappeared as she did. The Court would, no doubt, with its usual care and acumen, &c., &c., &c.

The master stated that he held a certificate of competency, and had passed in steam. He said, in his evidence, that the *Barley Barrel* was a first-class ship; he would go anywhere in her, with any cargo, and in any weather, and with a crew however small. His wages, or salary, amounted to £7 10s. a month, and he found his own charts and chronometers, &c. The owners were first-class people, extremely liberal as well as careful in everything; the ship and cargo were, he believed, fully insured. He had lost everything but his watch or pocket chronometer, which had been presented him for saving life some years ago. He had not brought it with him. It was with his mother's brother at Liverpool, who had kindly found the money for his counsel in the case. He had never lost a ship before; had never been in trouble in any way. His sobriety and competency had never been questioned—and were not questioned now. His vessel was not at all peculiar in dimensions or proportions; she had three tiers of beams, but only two decks laid. This he believed was usual. There were shifting boards, very stout and well fixed; they extended some distance down; quite far enough in his opinion. He could have had more put in if they had been wanted. The owners did not instruct him to do so; but they would not have objected to his spending money for purchasing and fitting more shifting boards: at least, he supposed not. The water-ballast tanks were a good size; very fine tanks indeed; he regarded them as giving great buoyancy to the ship, and, therefore, as very valuable; perhaps the buoyancy might have been better placed elsewhere, than down at the bottom, he was, however, not at all sure. Is satisfied that an empty air space in the water-ballast tanks did give great buoyancy; knows this, because they happened to get full of water just before they started, through the cocks getting turned the wrong way, when the pumps, instead of quite emptying them, quite filled them with water. This brought the deck at the vessel's waist to a level with the water-line; when the tanks were pumped out again she rose up and presented a fair side; cannot say how many feet, or how many inches; but

quite enough—he was sure of that. The crew did not complain. He knew what "drowning Plimsoll" meant. Plimsoll was not "drowned" this time, but was well out of the water. Never inquired who settled the place of the disc, or "pancake" as the men preferred to call it. He did not. As a matter of fancy, purely as a matter of fancy (and on being much pressed) he might, perhaps, have liked another two feet of clear side, or, perhaps, three feet; but only as a matter of fancy. The owner never objected to his having two feet more clear side. The ship was very strong. Did not think it strange or unusual that the pumps, valves, cocks, and pipes were so arranged that instead of pumping the tanks dry they might fill them. Thought it was a very common occurrence, even in classed ships. Was aware of the principle on which shore lifeboats were constructed. These boats turned over with great ease, and then righted themselves. They were very fine boats; they always righted themselves. The crew either kept in the boat with their cork life-jackets on, or jumped out and scrambled in again when the boat righted herself. Did not think it was at all surprising that those boats should roll over. They are very fine boats indeed. As regards grain-laden ships, he thought they sometimes, as now constructed and loaded, were the same in principle, and gave the same results in practice, as the lifeboats referred to; he knew his ship was, and did. He knew nothing of centres of gravity. Was not aware that his ship had a meta-centre. Had circular life-buoys. Had heard say that ignorance is bliss. Believed that the less owners or masters knew about some things the safer they were in Court. Supposed that this Court was no exception. Was quite sure he did not know how to calculate stability of a ship, or what treatment Siberian lentils required as to stowage. Had heard that a beer-barrel, if thrown into the sea and not ballasted, would roll over and over. Had never tried the experiment on his own account, and did not know for certain. The *Barley Barrel* was a first-class ship, very strong, nothing unusual about her, except that her deck fittings, coamings, and so forth, were very strong; the strongest and best he had ever seen; they would not let water down to the 'tween-decks or hold; that is, not unless the ship remained on her side. Did not see how the hold of a

ship could be too deep to carry plenty of cargo. The *Barley Barrel* had a little difficulty in "standing up" if there was any wind at all. Perhaps her centre of gravity of displacement was wrong somehow, and the meta-centre may have been wrong. She certainly seemed always ready to sail on one of her bilges. Means by that that she would steam whether she was upright or not, but quite as well, he thought, when listed over to one side or the other; it did not matter which side. Thought it not at all unusual for ships like the *Barley Barrel* to behave like that. He expected to be master of another *Barley Barrel* soon. He believed the underwriters and all concerned agreed with him that ships of the *Barley Barrel* class will sail well on their bilges. Thinks it was an advantage that his steamer steamed well on either bilge; thinks it was a very great advantage. Has no doubt the Register Societies took that point into favourable consideration in giving her a very high class; he should do so himself. He thinks the reasons are good; those reasons are, that when the ship was upright she would hold 180 tons of water on deck, in what was called the "well," and could not get rid of it easily while upright, whereas, when steaming on her bilge, the deck gave a capital slant for the sea to run off; in fact, the water could not lodge at all when she had that steady list. The weather was bad, but not so very bad; had seen worse—that was some years ago; it was before he was master of any *Barley Barrel*. The *Barley Barrel* eventually turned keel uppermost. They spent about six hours on the keel and bilges after she turned over. The deck fittings were very good; everything was first-class; that is how he accounts for the cargo not falling out at once. The ship was left floating bottom up and well out of the water. She was quite sound, and very first-class. Had seen a wooden ship float about bottom up, but had never seen an iron ship do so before.

The *Barley Barrel* was a nice easy roller, if there was a little wind or any swell on when she made way on her bilge. He had known the crew to get on the weather rail. Did not know that it was to be ready to run round her outside so as to scramble on to the bottom part if she should turn over; might have been, but

does not know. Once they spent a whole night on the weather rail. He often spent part of the day there. Always kept his boats ready, but never quite knew whether the lee or the weather boat would be wanted. Did not try to stop her rolling by hoisting square topsail; perhaps she was a little tender—perhaps he thought so. Thought the casualty arose only through stress of weather. Could be from no fault in the ship or in the loading. He knew nothing about stowage of linseed or lentils. Had never carried Siberian lentils before—not his business. Had nothing to do with with the loading. Would have done anything, or agreed to any expense, at owner's cost, at port of loading, to stow the cargo properly and secure it. Had no feeders, but had shifting boards. Would not have agreed to take *less* cargo then she could carry. Had no orders from owners. Does not know that they would not have employed him again if he had refused 500 tons, or 300 tons, or 200 tons, or 50 tons. Does not know; never did refuse one ton, and therefore cannot say. It may be his impression. The ship was a good ship—first-class. There is plenty of masters to take charge of *Barley Barrels*, and plenty of *Barley Barrels* for masters to take charge of. Never heard of any difficulty in classing them. Knows that some have been built under inspection. Never heard of any difficulty in insuring them at market rates. Has heard that underwriters always make a fuss when one is lost, and demand inquiry. Never heard that the underwriters pay any attention to results of inquiries. Does not see why there should be inquiry in this case; the underwriters received the premium, and took the risk, and ought to pay. Is sure that if the *Barley Barrel* had not been first-class, she would not be 1,000 A1 in Lloyd's book; that is, perhaps, the only thing that he is sure of. Thinks Government ought to fix four inches to the foot for clear side. Cannot say why he thinks so. Owners never told him not to allow four inches. Owners had the "Plimsoll's eye" put on the ship; he did not; cannot say if it was too high.

The examination of the master having ended, the Court desired to put some questions. The assessors wished to examine the master themselves, but this was not allowed. The justices seemed to fail to understand the assessors' questions, and allowed

what they (the justices) thought right, and *no more*. The questions put by the Court thus threw no new light on the facts—some of them were answered by the master as follows:—

He was a native of (. . .); had suffered from rheumatism six years ago; had been examined in colour blindness. The mast-head light was not burning at the time of the calamity. His ship was of iron. The machinery did not break down. The weather was bad, but not so bad as he had seen. Carried lime-juice, and the doctor's book; had never heard of Wobbles's patent vulcanised vegetable vivifier; could not account for the casualty; the lead was not hove. The ship was first-class, everything was first-class; had proper charts; all ordinary precautions were taken in stowing cargo; has no means of knowing whether other than ordinary precautions were necessary for Siberian lentils in bulk; the bottom of the ship was painted red; there was no figure-head. The stem was straight; the propeller had two blades only, and was of *cast* iron. Has lost his log and all records. Cannot state the temperature of the engine-room. Was well attended to on board the Chinese ship. His ancle was sprained in running from deck over the bilges, but is better, &c., &c., &c. Other witnesses gave evidence as voluminous and clear as the master.

The Court sat for five days, and delivered "judgment," which occupied several pages of printed matter. The chief points in it are—"The ship was a British ship; she was owned in 64 shares; she was 340·7 ft. long, 32·2 ft. broad, 30·7 ft. deep, and had a collision bulk-head; she was fitted with water-ballast tanks; was classed in Lloyd's as 1,000 A 1, and in Underwriters' Registry of Liverpool, 27 years and $\frac{7}{12}$ths in red; her tonnage was 2,145$\frac{17}{100}$; that she was a screw steamer, with engine of 219½ N.H. power, &c., &c., &c. (three pages), and she carried 5,702¼ tons of Siberian lentils in bulk; that she left Pitcairns Island, &c., &c., &c. (three pages); that she had two boats, two compasses, in good order, and the usual log and lead lines, &c., &c., &c. (a page and a half). The Court remarks that the delay in holding the inquiry was not in any way caused by any negligence or default on the part of the Court; that the ship was staunch, tight, and well found, &c., &c., &c., (two pages); that the lead was not hove; that she turned over,

&c., &c., &c. (three pages); that the master, &c., &c., &c. (four pages).

"The Court cannot help remarking before concluding their report that the ship seems to have been of the ordinary approved type, but of extraordinary strength, and to have been a very good ship altogether. It was shown by the evidence of the master that she could and did sail as well on either bilge as on an even keel, and was easy in a sea way; and they think it right that this should be known, as the owners seem to have spared no expense to get a fine ship or to secure the deck fittings in a very high-class way; that there was no difficulty as to classification or insurance, and that no blame can be attributed to the owners," &c., &c., &c. (three pages), "who left everything aboard to the master. So good was the ship that there is no proof that she has yet gone down, but they think there should be a Government load-line, and that every ship should be surveyed. That the master seems to have acted with great bravery, as did all," &c., &c., (two pages); "and the Court have great pleasure in reporting that it is not a case in which they should deal with his certificate," &c., &c., &c.; "that they think some notice should be taken of the service of the officers of the Chinese gun boat," &c., &c., &c. (two pages); "and that they make no order as to costs."

So ends the report.

This report is a curious specimen of a very lengthy document, which, going into details of all sorts, relevant and irrelevant, throws no light whatever on the true cause of the casualty. But some of the older reports of the Justices Courts were not less vague. We trust that arrangements will some day be made which will place these inquiries solely in the hands of the Wreck Commissioner, or of the Stipendiary Magistrate and Assessors, whose judgments are, and always have been, "short winded," and noted as models of clearness of style, and of thoroughness in the way in which they get to the bottom of everything. We are satisfied that the report of the Wreck Commissioner would, in such a case as this, have been scathing in its denunciation of the designer of a ship of the proportions named, and would have pointed out that loss was to have been expected through want of stability,

and that loss of life is the sole and only result to be expected in this and similar cases.

His report would have shown that the designer of such a ship is criminally liable; and that those who insured her for such a voyage, and such a cargo, were equally guilty, if not more guilty, than the owners; whilst the master is a mere drudge, as unable to help himself as to fly.

CORRESPONDENCE.

A NEW FORM OF RUDDER.

To the Editor of the "Nautical Magazine."

Sir,—It is well-known that many a collision at sea might have been avoided if a greater amount of rudder power had been available at the critical moment. It is, however, found in practice that a large rudder is inconvenient, as it not only requires great power to move it, but it is also more liable to injury from the violence of the waves than a smaller one.

Mr. Scott Russell's rule for the size of rudders is that their extreme length shall equal one-fiftieth of the length of the ship + one foot.

My object in writing this letter is to suggest a new form of rudder, which, in its normal condition, shall not exceed the usual dimensions, but which, *on special occasions*, can be made to exert from 30 to 50 per cent. more power than an ordinary rudder.

It consists of two iron plates firmly bolted together, but leaving a clear space between them. In the centre is placed *a second rudder*, capable of being made to slide backwards and forwards between the plates. This extra rudder may be worked by chains or other suitable gear.

It is more especially intended for use where the steering is effected by steam power.

I am, yours obediently,

CHAS. STEWART, M.A.

50, Colebrooke Row, N., January 22, 1880.

GRAIN SHIPS.

To the Editor of the "Nautical Magazine."

Sir,—The following anecdote may be interesting to your readers. The captain of a large colonial-built vessel, while perusing the article on "Grain Ships" in the *Nautical Magazine* for January, paused when he came to that part describing the tenons of stem and stern posts; and, turning to a friend, said: "Tenons to stem and post. I served my time as a shipwright in a large yard in the Dominion, and when building on speculation we never tenoned either—that would have taken up too much time. When they were hoisted in place and drawn to the proper bevel, a saw was run through the end in line with the keel, and when landed, a couple of cleats kept the keel in place until the hood ends made all secure." On being questioned, the man emphatically reiterated his statement, although it scarcely seems possible. The keenest surveyor cannot see through a six-inch plank, but the great corporation whom he represents should, before classification, demand a certificate of construction from the builder, explaining a few important points. If this is not done, the foundering of these vessels will increase in a direct ratio with the increase of trade, until the cheapness of iron and the scarcity of ship timber drives them out of the market.

Yours faithfully,

W.

SHIPMENTS OF COALS AND COKE, 1877-8-9.

To the Editor of the "Nautical Magazine."

Sir,—For the information of your readers, I have compiled from that most useful publication, *Browne's Export List*, a comparative statement of coal and coke shipments (coastwise and foreign) for the years of 1877, 1878, and 1879, showing the increase and decrease at each port in 1879 as compared with its predecessor.

In point of rank, the Tyne ports still hold the first place, Cardiff second, Sunderland third, Newport fourth, Swansea fifth, the Hartlepools sixth, and Liverpool the seventh. In the preceding year (1878) Liverpool stood sixth and Swansea seventh—thus showing the latter port to have gained two points in 1879, whilst

the Hartlepools and Liverpool have each lost one, although Liverpool shows the respectable increase of 70,641 tons in the past year.

Port.	1877. Tons.	1878. Tons.	1879. Tons.	Increase. Tons.	Decrse. Tons.
Alloa	94,179	106,483	175,091	68,608	—
Amble	81,786	97,869	167,873	70,004	—
Ardrossan	248,326	235,669	284,610	48,941	—
Ayr	331,151	384,062	362,514	—	21,548
Blyth	200,007	195,020	234,154	39,134	—
Bo'ness	90,352	69,881	63,391	—	6,490
Cardiff	4,484,140	4,867,822	5,098,459	230,637	—
Charlestown	142,091	160,133	195,910	35,777	—
Dundee	67,817	80,976	69,916	—	11,060
Glasgow	318,091	226,708	247,466	—	19,242
Goole	279,715	296,366	342,648	46,282	—
Grangemouth	172,881	161,171	119,310	—	41,861
Granton	173,850	167,404	186,516	19,112	—
Greenock	137,837	130,741	119,360	—	11,381
Grimsby	308,505	291,784	295,415	3,631	—
Hartlepools	1,325,136	1,186,748	1,149,478	—	37,270
Hull	489,706	489,620	464,370	—	25,250
Inverkeithing	—	1,671	3,870	2,199	—
Irvine	64,535	64,030	106,976	42,946	—
Liverpool	1,007,268	964,668	1,035,309	70,641	—
Llanelly	173,432	194,014	187,510	—	6,504
Middlesborough	116,654	110,727	105,334	—	5,393
Newport	1,437,402	1,651,473	1,927,121	275,648	—
Port Glasgow	17,616	6,933	10,649	3,716	—
St. Davids	41,105	43,747	55,779	12,032	—
Stockton	—	30	1,222	1,192	—
Seaham	531,697	580,442	594,183	13,741	—
Sunderland	3,235,099	3,175,124	3,121,055	—	54,069
Swansea	914,799	932,856	1,225,950	293,094	—
Troon	487,394	394,677	395,637	960	—
Tyne Ports	6,627,222	6,550,546	7,364,065	808,519	—
Whitehaven	132,580	139,550	217,854	78,304	—

I have heard it rumoured that this useful monthly publication—*Browne's Export List*—is likely to be discontinued for lack of pecuniary support, but I trust the report is not correct. It contains valuable information for merchants, manufacturers, coal-owners, coal-fitters, and others, and, should it cease to exist, it

will be most difficult to obtain the same information even at an increased expense. It will be a loss to this district, as well as to other parts of the country, if it has taken its leave of us with the close of the year 1879.

I am, &c.,

R. THUBRON.

Dock and Port Charges Offices,
Newcastle-on-Tyne, Jan. 19, 1880.

DISTINGUISHING LIGHTS FOR LIGHTHOUSES.

To the Editor of the "Nautical Magazine."

SIR,—Referring to the article on the above subject in the current number of your Magazine, permit me to state that a short time since Messrs. E. Marlborough and Co., published a little book entitled, "How to learn the Morse Alphabet in half an hour." The system therein explained is so simple, that I am sure any sailor could learn in less than the time stated in the title.

I am, Sir, your obedient servant,

ELECTRICIAN.

London Institution, Finsbury Circus, E.C.,
January 2, 1880.

To the Editor of the "Nautical Magazine."

SIR,—Your valuable article on Sir William Thomson's proposal for changing the present system of lighthouse distinctions ought to be carefully read by all nautical men. My opinion is, that if seamen thoroughly realised the full extent of the changes which would be brought about by Sir William Thomson's system, there would be a general outcry against it by all those who have actually to make use of the lights. I do not believe one shipmaster out of twenty knows what is proposed; even those who have read up the subject do not fully comprehend it. I for one (not, I hope, deficient in intelligence), cannot understand how the dots and the dashes are to be made, whether with flashes of light or with eclipses, and because sailors don't know what is intended, and the plan is not simple enough for them to master it easily, so they don't make any stir about it. Besides, lights are altered quite often enough

now, and we don't want any more scientific novelties to puzzle us in passing the Board of Trade examinations, or to confuse us when we want all our energies for looking after our ships. I hope the Trinity Board will continue to give us good strong lights with plain distinctions without giving us more work and anxiety to find out what lights they are.

By the way, I may mention that when pretty close to a revolving light you see it gradually open and grow stronger and stronger, and after reaching its greatest power it dies gradually away. At a long distance you lose this effect, and often see only the brightest part, like a flash. Now, how is this to be distinguished from a flashing light? Is a *revolving* light a *flashing* light? If so, there ought not to be two names for one kind of light.

I am, Sir, yours faithfully,

London, Jan. 20, 1880. A NAUTICAL OBSERVER.

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, *High Holborn, London, W.C.*, *and* 6, *Lord Street, Liverpool.*

ENGLISH (APPLICATIONS).

5153. Edgar E. Mann, Lawrence, Essex, U.S.A. "Improvements in signal buoys."

5175. Jean B. Siccardi, Varazza, Genoa, Italy. "An improved mode of insulating mariners' compasses." (A communication.)

5184. Stephen Davies, Ebbw Vale, Wales. "An improved apparatus to be fitted to vessels and steamers for increasing their speed and improving their buoyancy."

5196. Henry Brown, Charlestown, South Carolina, U.S.A. "Improvements in apparatus for ringing alarm bells on floating buoys, at sea or in harbours." (A communication.) (Complete specification.)

5250. David M. Somerville, Liverpool. "An improved apparatus for saving life at sea or on other waters, applicable also for other purposes."

5292. Zachariah Oram and Philip B. Grove, Philadelphia, U.S.A. "Improvements in and relating to the construction of ships or vessels with twin propellers." (A communication.)

5322. Samuel W. Snowden, Dublin. "Improvements in screw-propellers."

5329. James Newall and George W. Newall, Canning Town, Essex. "Improvements in screw-propellers."

13. David Parks, Boston, Massachusetts, U.S.A. "Improvements in and relating to ship's sleeping berths." (A communication.) (Complete specification.)

19. Max Nordmann, Junr., Dresden, Saxony. "Improvements in the means and apparatus for steering steamships and other vessels."

141. James Harrold Barry, Limerick. "Improvements in apparatus for turning in and out, lowering and disengaging ship's boats, and for carrying them inboard."

174. Carl Otto Ramstedt, Helsingfors, Finland. "Improvements in signalling at sea by means of illuminated steam, and in apparatus employed therein."

200. William C. Brown, Sheffield. "Improvements in appliances or apparatus for supporting the human body in water."

202. William B. Thompson, Dundee. "Improvements in apparatus for signalling at sea."

231. Frederick W. Heinke and George Lang, both of Soho, Middlesex. "Improvements in submarine electric lanterns."

AMERICAN.

222049. David Huston, Boston, Mass. "Self-levelling berths for vessels."

222111. Theodore D. Wilson, U.S. Navy. "Air ports for for vessels."

222215. Thomas G. Wardwell and Henry A. Currier. "Buoys for indicating sunken vessels."

222406. Amos Johnson, Baltimore, Md. "Steering apparatus for vessels."

222407. Amos Johnson, Baltimore. "Fastenings for hatches of ships."

222718. James H. McLean, St. Louis, Mo. "A marine torpedo."

BELGIAN.

49830. W. A. Leggo. "Propelling balloons and vessels."

49906. J. Pintsch. "Modifications in lightships."

49989. J. Fricot. "A rudder with a moveable screw, applicable to vessels in general."

FRENCH.

131571. Longfellow. "A sea-compass."

131738. Cooper. "An automatic governor for ship propellers."

GERMAN.

8653. J. L. Lay, Paris. "Improvement in electric apparatus for steering, controlling, and firing torpedo boats."

ITALIAN.

56. G. Della Marroniere, Paris. "A propeller for steamships, torpedoes, &c."

65. E. A. Elaminda, Delft (Holland). "A telegraphic apparatus for ships, and for showing the position of the helm."

91. P. Tagliacozzo, Naples. "A safety anchor."

93. G. E. Balsamo, Lecce. "A propeller for war vessels and merchantmen."

112. J. Chrétien and C. Félix, Paris. "An apparatus worked by electricity at a distance for traction, transporting, shipping and unshipping, mining, agriculture, and navigation."

161. H. Satre, Lyons (France). "A dock boat for transporting other boats."

169. W. B. Barker, Hoboken (America). "A marine safety-signal."

9. J. Billhand, Bordeaux. "A fixed and insubmersive bath-boat."

VICTORIAN.

2653. Robert Wilcox, Melbourne, Victoria. "Improvements in steam-vessels."

2520/79. Wm. Benjamin Barker, of Hoboken, U.S.A. "An

improved code and apparatus for marine safety signalling." This invention consists of two portions :—the code or system of signals for indicating a vessel's course, and secondly, the apparatus for automatically operating a fog-horn or whistle to give such signals. According to the first part of his invention, the inventor subdivides the horizon or compass card into eight equal parts, and to each part allots a given signal, thus :—

N. to N.E. ———— —— ——
N.E. to E. ———— —— —— ——
E. to S.E. ———— —— ————
S.E. to E. ———— —— —— ————
S. to S.W. —— —— ————
S.W. to W. —— —— —— ————
W. to N.W. —— ———— ——
N.W. to N. —— —— —— ——

The long dashes representing long sounds of considerable duration, say six seconds, and the short dashes, short sounds, say of three seconds. It will be noticed that all the signals having any east in them begin with a long sound, and all those having any west in them begin with a short sound. All the signals having any north in them end with a short sound, while all those having any south in them end with a long sound. The apparatus for operating the fog-horn, &c., consists mainly of a bellows or equivalent pressure-generating mechanism, arranged in a frame, and operated by a treadle, lever, or other device. In connection with this mechanism is a plate or disc, perforated or otherwise, and formed with a series of long and short holes, apertures, or operating devices, adapted to control the passage of the air, steam, &c., to the fog-horn or whistle in regulated quantities, so as to regulate the length of the blast or signal given. The signal operating devices are controlled by a pair of cylinders working one within the other, one provided with cam operating surfaces, and the other with cams or cam surfaces, so arranged that they shall act together to cause one-eighth of a revolution of the plate or disc already mentioned. The length of the whole would regulate the length of the blast. A dial is placed at the upper part

of the apparatus, marked with the eight points of the compass already referred to, with the code indicating spaces between. A handle provided with a pointer is applied to the axis of the machine, so as to set it in position to give any required signal. There is also an automatic locking device, so that when set the machine cannot be changed till that signal be given. When using steam, an arm is provided for turning it on and off, and suitable valves are provided for regulating the passage of either air or steam.

2057/79. John Fisher, Southampton Buildings, London. "Improvements in the construction of and in the method of driving screw-propellers." The object of this invention is to lessen the shocks to the machinery occasioned by broken water when first starting, &c. Room is left in the opening in which the screw works to allow of its sliding backwards and forwards for a short distance, and a like arrangement is provided inside the vessel, so that, while continually turning round, the shaft may travel lengthwise as required. Suitable helical or other springs are provided and placed between flanges on the two parts of the shaft where the joint is placed. When starting the screw, and before the vessel has acquired any forward motion, part of the force of the blades striking the water is taken up by the springs; but, when the vessel is in motion, the thrust is always taken by the thrust bearings in the ordinary manner, the shocks being softened by the springs. Should any sudden cause retard the revolution of the screw, or hasten the forward movement of the vessel, the springs will expand and lessen the shock which would otherwise be occasioned.

TIDE TABLES FOR FEBRUARY, 1880.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M. H. M.	London Bridge. P.M. H. M.	Hull. A.M. H. M.	Hull. P.M. H. M.	North Shields. A.M. H. M.	North Shields. P.M. H. M.	Leith. A.M. H. M.	Leith. P.M. H. M.	Devonport. A.M. H. M.	Devonport. P.M. H. M.	Dover. A.M. H. M.	Dover. P.M. H. M.
S	1	4 57	5 15	9 28	9 48	6 23	6 43	5 17	5 37	8 37	8 55	2 8	2 28
M	2	5 32	5 52	10 8	10 28	7 4	7 25	5 59	6 22	9 13	9 32	2 44	3 5
Tu	3	6 13	6 35	10 50	11 17	7 48	8 15	6 46	7 11	9 54	10 18	3 26	3 47
W	4	6 58	7 26	11 49	—	8 46	9 22	7 41	8 16	10 44	11 15	4 12	4 39
Th	5	7 58	8 34	0 26	1 4	10 3	10 46	8 55	9 39	11 50	—	5 10	5 46
F	6	9 17	10 6	1 44	2 26	11 31	—	10 24	11 8	0 29	1 15	6 28	7 14
S	7	10 54	11 38	3 8	3 50	0 15	0 55	11 49	—	2 2	2 46	8 0	8 40
S	8	—	0 17	4 28	5 0	1 30	1 59	0 24	0 53	3 29	4 6	9 14	9 44
M	9	0 50	1 17	5 27	5 52	2 26	2 51	1 20	1 46	4 35	5 2	10 11	10 36
Tu	10	1 43	2 7	6 15	6 38	3 12	3 32	2 9	2 30	5 28	5 52	11 0	11 23
W	11	2 28	2 48	7 0	7 20	3 52	4 12	2 50	3 9	6 14	6 34	11 45	—
Th	12	3 8	3 28	7 40	7 59	4 32	4 51	3 28	3 46	6 54	7 12	0 6	0 27
F	13	3 45	4 2	8 17	8 34	5 10	5 28	4 4	4 22	7 28	7 44	0 47	1 6
S	14	4 21	4 38	8 51	9 8	5 46	6 4	4 40	4 58	8 0	8 16	1 25	1 48
S	15	4 56	5 10	9 25	9 42	6 21	6 38	5 15	5 33	8 32	8 46	2 1	2 18
M	16	5 25	5 41	9 59	10 16	6 55	7 12	5 50	6 8	8 59	9 13	2 35	2 52
Tu	17	5 59	6 17	10 34	10 54	7 31	7 52	6 28	6 49	9 29	9 45	3 9	3 26
W	18	6 37	6 59	11 19	11 47	8 16	8 44	7 12	7 39	10 4	10 27	3 45	4 7
Th	19	7 23	7 53	—	0 21	9 18	9 58	8 11	8 50	10 55	11 29	4 32	5 8
F	20	8 27	9 8	0 58	1 37	10 40	11 23	9 33	10 18	—	0 9	5 39	6 21
S	21	9 59	10 45	2 19	3 0	—	0 6	11 0	11 38	0 51	1 33	7 5	7 46
S	22	11 26	—	3 39	4 14	0 45	1 18	—	0 12	2 15	2 54	8 24	8 57
M	23	0 2	0 34	4 45	5 10	1 47	2 10	0 41	1 4	3 32	4 2	9 24	9 46
Tu	24	0 59	1 20	5 29	5 48	2 30	2 48	1 24	1 48	4 27	4 50	10 6	10 26
W	25	1 39	1 58	6 6	6 24	3 4	3 20	2 0	2 17	5 12	5 33	10 45	11 4
Th	26	2 15	2 32	6 42	7 0	3 36	3 52	2 34	2 50	5 52	6 10	11 23	11 42
F	27	2 48	3 4	7 18	7 36	4 8	4 26	3 6	3 22	6 28	6 46	—	0 1
S	28	3 21	3 39	7 53	8 10	4 44	5 2	3 39	3 57	7 4	7 22	0 20	0 39
S	29	3 56	4 14	8 27	8 45	5 21	5 40	4 15	4 34	7 40	7 58	0 59	1 19

Week Day.	Month Day.	Weston-Super-Mare. A.M. H. M.	Weston-Super-Mare. P.M. H. M.	Liverpool. A.M. H. M.	Liverpool. P.M. H. M.	Greenock. A.M. H. M.	Greenock. P.M. H. M.	Queenstown. A.M. H. M.	Queenstown. P.M. H. M.	Kingstown. A.M. H. M.	Kingstown. P.M. H. M.	Londonderry. A.M. H. M.	Londonderry. P.M. H. M.	Brest. A.M. H. M.	Brest. P.M. H. M.
S	1	9 47	10 4	2 0	2 18	2 49	3 8	8 1	8 20	1 52	2 12	10 51	11 12	6 42	7 2
M	2	10 21	10 38	2 37	2 57	3 27	3 46	8 39	8 58	2 33	2 55	11 36	—	7 22	7 44
Tu	3	10 57	11 19	3 18	3 41	4 7	4 30	9 19	9 44	3 18	3 42	0 4	0 36	8 8	8 34
W	4	11 47	—	4 8	4 41	4 56	5 25	10 12	10 44	4 11	4 46	1 13	1 54	9 4	9 40
Th	5	0 20	1 0	5 19	6 5	6 0	6 41	11 24	—	5 24	6 4	2 39	3 28	10 28	11 12
F	6	1 46	2 35	6 55	7 42	7 27	8 18	0 12	0 59	6 46	7 29	4 4	4 48	—	0 1
S	7	3 22	4 8	8 25	9 2	8 58	9 37	1 46	2 27	8 11	8 49	5 17	5 46	0 46	1 24
S	8	4 46	5 22	9 33	10 1	10 11	10 41	3 2	3 34	9 28	9 54	6 14	6 41	1 57	2 26
M	9	5 53	6 19	10 25	10 48	11 8	11 33	4 2	4 27	10 20	10 40	7 6	7 30	2 51	3 13
Tu	10	6 43	7 5	11 10	11 32	11 57	—	4 50	5 12	11 0	11 20	7 58	8 14	3 35	3 56
W	11	7 26	7 46	11 52	—	0 19	0 40	5 33	5 58	11 40	11 59	8 33	8 50	4 16	4 36
Th	12	8 5	8 23	0 12	0 31	1 0	1 20	6 12	6 31	—	0 18	9 7	9 24	4 55	5 18
F	13	8 40	8 56	0 49	1 7	1 39	1 57	6 49	7 6	0 37	0 56	9 41	9 57	5 31	5 47
S	14	9 12	9 27	1 24	1 41	2 14	2 30	7 23	7 40	1 14	1 32	10 18	10 29	6 8	6 19
S	15	9 42	9 56	1 57	2 18	2 46	3 2	7 56	8 11	1 50	2 7	10 46	11 8	6 36	6 58
M	16	10 10	10 24	2 29	2 45	3 18	3 34	8 26	8 41	2 24	2 42	11 22	11 45	7 10	7 27
Tu	17	10 38	10 58	3 1	3 19	3 50	4 8	8 58	9 17	3 0	3 20	—	0 11	7 45	8 6
W	18	11 13	11 40	3 40	4 4	4 28	4 51	9 38	10 5	3 42	4 9	0 40	1 18	8 30	8 59
Th	19	—	0 15	4 35	5 14	5 19	5 54	10 39	11 19	4 41	5 19	1 51	2 34	9 34	10 16
F	20	0 54	1 39	5 58	6 48	6 34	7 19	—	0 4	5 58	6 39	3 16	3 58	11 4	11 51
S	21	2 24	3 7	7 34	8 13	8 4	8 45	0 50	1 31	7 21	7 59	4 37	5 10	—	0 33
S	22	3 47	4 25	8 48	9 19	9 21	9 53	2 10	2 44	8 34	9 6	5 37	6 1	1 9	1 41
M	23	4 56	5 22	9 43	10 3	10 20	10 44	3 12	3 37	9 33	9 57	6 28	6 44	2 7	2 27
Tu	24	5 45	6 6	10 21	10 39	11 4	11 23	3 58	4 17	10 15	10 32	7 3	7 21	2 46	3 4
W	25	6 27	6 47	10 56	11 13	11 42	mid.	4 36	4 54	10 48	11 4	7 39	7 57	3 22	3 39
Th	26	7 5	7 23	11 30	11 48	—	0 18	5 12	5 30	11 20	11 37	8 13	8 29	3 56	4 13
F	27	7 41	7 59	—	0 6	0 36	0 54	5 48	6 6	11 54	—	8 45	9 1	4 30	4 47
S	28	8 16	8 33	0 24	0 42	1 12	1 30	6 24	6 42	0 12	0 30	9 17	9 34	5 5	5 23
S	29	8 50	9 7	1 0	1 18	1 48	2 7	7 0	7 18	0 49	1 8	9 52	10 10	5 41	5 59

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add.* − *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H.	M.	Port of Reference.
Aberdeen	−1	17	Leith
Aberystwyth	−3	52	Liverpool
Alderney	+2	59	Brest
Antwerp	+5	13	Dover
Arbroath	−0	42	Leith
Arcachon	+0	50	Brest
Arklow	−2	25	Kingstown
Ayr	−0	18	Greenock
Banff	−1	49	Leith
Bantry harbour	−1	14	Queenstown
Barnstaple bridge	−0	26	Weston-s.-Mare
Bayonne	−0	2	Brest
Beachy head & Rye bay	+0	8	Dover
Beaumaris	−0	51	Liverpool
Belfast	+2	42	Londonderry
Berwick	−1	5	N. Shields
Blyth	−0	8	N. Shields
Bordeaux	+3	3	Brest
Boulogne	+0	13	Dover
Bridport	+0	22	Devonport
Bristol & King Road	+0	19	Weston-s.-Mare
Cadiz	−2	2	Brest
Caernarvon	−1	56	Liverpool
Calais	+0	37	Dover
Campbellton	−0	23	Greenock
Cardiff	+0	2	Weston-s.-Mare
Cardigan bar	−4	22	Liverpool
Carlingford bar	−0	10	Kingstown
Chatham	−0	47	London
Cherbourg	+4	2	Brest
Coleraine	−1	37	Londonderry
Coquet Road	−0	23	N. Shields
Cordouan Tower	−0	10	Brest
Cowes (West)	−0	27	Dover
Crinan	+4	41	Greenock
Cromarty	−2	21	Leith
Dartmouth	+0	33	Devonport
Deal & Downs	+0	3	Dover
Dieppe	+7	19	Brest
Donaghadee	+0	8	Kingstown
Donegal harbour	+0	17	Queenstown
Douglas & Ramsay	−0	11	Liverpool
Dublin bar	+0	2	Kingstown
Dundalk	−0	16	Kingstown
Dungeness	−0	27	Dover
Dunkerque	+0	56	Dover
Exmouth	+0	38	Devonport
Falmouth	−0	46	Devonport
Fecamp	+6	57	Brest
Ferrol	−0	47	Brest
Flamborough head	−1	59	Hull
Fleetwood	−0	12	Liverpool
Folkestone	−0	5	Dover
Fowey	−0	29	Devonport
Flushing	+1	42	Dover
Galway bay	−0	26	Queenstown
Gibraltar	−1	27	Brest
Glasgow (Port)	+0	10	Greenock
Gloucester	+2	51	Weston-s.-Mare
Granville	+2	26	Brest
Gravesend	−0	48	London
Grimsby (Great)	−0	53	Hull
Guernsey (St. Peter)	+2	50	Brest
Hartlepool	+0	5	N. Shields
Harwich	−1	52	London
Havre	+6	4	Brest
Helgoland	+0	21	Dover
olyhead	−1	12	Liverpool
oly Island harbour	−0	53	N. Shields
onfleur	+5	42	Brest
verness	−1	59	Leith
Jersey (St. Helier)	+2	38	Brest
Kinsale	−0	18	Queenstown
Lerwick (Shetland)	−3	47	Leith
Limerick	+1	15	Queenstown
Lisbon bar	−1	17	Brest
Littlehampton	+0	24	Dover
Llanelly bar	−0	38	Weston-s.-Mare
Lowestoft	−4	1	London
Lynn & Boston Deep	−0	29	Hull
Margate	−2	18	London
Maryport	+0	3	Liverpool
Milford Haven entr.	−0	58	Weston-s.-Mare
Montrose	−0	52	Leith
Morlaix	+1	6	Brest
Needles point	−1	26	Dover
Newcastle	+0	23	N. Shields
Newhaven	+0	39	Dover
Newport	+0	16	Weston-s.-Mare
Nieuport	+1	6	Dover
Nore	−1	28	London
Orfordness	−2	43	London
Oporto	−1	17	Brest
Ostende	+1	18	Dover
Padstow	−1	41	Weston-s.-Mare
Peel, Isle of Man	−0	15	Liverpool
Pembroke Dock	−0	42	Weston-s.-Mare
Penzance	−1	13	Devonport
Peterhead	−1	43	Leith
Piel harbour, Barrow	−0	18	Liverpool
Plymouth breakwater	−0	6	Devonport
Poole	−2	2	Dover
Port Carlisle	+0	47	Liverpool
Portland breakwater	+1	18	Devonport
Port Patrick	−0	58	Greenock
Portsmouth	+0	29	Dover
Ramsgate	−2	19	London
Rotterdam	+4	33	Dover
Santander	−0	17	Brest
Scarborough	+0	48	N. Shields
Selsea bill	+0	33	Dover
Sheerness	−1	21	London
Shoreham	+0	22	Dover
Sligo bay	+0	17	Queenstown
Southampton	−0	42	Dover
Spurn point	−1	3	Hull
St. Ives	−2	10	Weston-s.-Mare
St. Malo	+2	18	Brest
St. Mary (Scilly)	−1	16	Devonport
St. Nazaire	−0	7	Brest
Stornoway	+6	38	Greenock
Stromness (Orkneys)	−5	17	Leith
Sunderland	−0	1	N. Shields
Swansea bay	−0	58	Weston-s.-Mare
Tay bar	−0	11	Leith
Tees bar	+0	22	N. Shields
Tenby	−1	12	Weston-s.-Mare
Thurso	−5	49	Leith
Torbay	+0	17	Devonport
Tralee bay	−0	58	Queenstown
Ushant (Ouessant)	−0	15	Brest
Valentia harbour	−1	19	Queenstown
Waterford	+0	19	Queenstown
Westport	−0	4	Queenstown
Wexford	+2	20	Queenstown
Whitby	+0	22	N. Shields
Whitehaven	−0	9	Liverpool
Wick	−2	55	Leith
Wicklow	−0	41	Kingstown
Workington	−0	19	Liverpool
Yarmouth road	−4	43	London
Youghall	+0	13	Queenstown

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
34	England—East Coast—North Foreland	Intended alteration of light.
35	„ The Downs—N.E. Goodwin	Alteration of buoy.
36	„ South Coast—Plymouth Sound	Intended alteration of breakwater light.
37	Ireland—South Coast—Queenstown	Particulars of buoyage.
38	North Sea—Jade River—Williamshaven	New light near torpedo harbour.
39	„ Maas River—Bokke Gat	Various alterations.
40	Baltic Entrance — Kattegat — North Ronner	Proposed new light and fog-signal.
41	„ „ Trindelen	Proposed alteration in light.
42	„ „ Kobber Ground	Proposed alteration of light.
43	„ „ Anholt Knobben	Proposed alteration of light and new fog-signal.
44	Baltic—Stor Strom—Sicelland—Ore	New lights.
45	„ „ Falster—Orehoved	New lights.
46	„ Prussia—Dars Point	Proposed fog-signal.
47	„ „ Swinemunde	Establishment of time-ball.
48	„ Bornholm—Due Odde	Proposed light.
49	„ „ Due Odde Point	Proposed light and fog-signal.
50	„ „ Hammar Point	Proposed fog-signal.
51	„ Russia—Backofen	Particulars of light.
52	„ „ Windau	Alteration in harbour lights.
53	Gulf of Finland—Paker Ort	Alteration in range of light.
54	Bothnia Gulf—Finland—Rafso Fiard	New light on Kallo islet.
55	France—West Coast—Brest	Alteration of La Vendrée shoal buoy.
56	„ „ Gironde River—Calonge Canal	New light.
57	„ „ Quiberon Bay—Les Grands Cardinaux	New light on Grongue-Gues rock.
58	Portugal—West Coast—Tagus River	Particulars of leading lights for the bar.
59	Mediterranean—France—Toulon	New light.
60	„ Adriatic—Trieste Bay	Permanent withdrawal of Grado light-vessel.
61	„ Saloniki Bay—Vardar Spit	New light-vessel—shortly.
62	„ Roumelia—Dédéagatch	New light—shortly.
63	„ Gulf of Kos—Budrum	New lights—shortly.
64	„ Karamania— Kastelorigo Islet	New lights—shortly.
65	„ Khios Strait—Chesmen Kezil Point	New light.
66	„ Mityleni Channel Makaronia	New lights.

MONTHLY ABSTRACT OF NAUTICAL NOTICES—*Continued.*

No.	PLACE.	SUBJECT.
67	MEDITERRANEAN—various places	List of lighthouses in course of construction.
68	BLACK SEA—Odessa	New breakwater and proposed lights.
69	" " Quarantine Mole	A third light.
70	" Trebizond—Kalmek Point	Alteration of light.
71	" Amastra	Alteration of light.
72	" Cape Kefken—Kirpen Islet	New lights.
73	" Roumelia—Cape Emineh	Proposed new light.
74	" various places.	Lights to be shortly exhibited.
75	NORTH ATLANTIC—Azores—St. Michael—Ponta Delgada	Destruction of light at breakwater.
76	AFRICA—East Coast—Zanzibar	Prohibited anchorage.
77	JAPAN—Kiusiu—Pallas Rocks	Position and other particulars.
78	" Nipon—Tsugar Strait	Discovery of sunken rock.
79	SOUTH AUSTRALIA—Gulf of St. Vincent—Edithburgh	New light on jetty.
80	AUSTRALIA—Bass Strait—Currie Harbour	New light.
81	NEW ZEALAND—Middle Island—Otago	Information respecting the bar and harbour.
82	UNITED STATES—Georgia—Tybee Island	Alteration of buoyage.
83	NORTH ATLANTIC—Bermuda—St. David Island	Light established.

NAUTICAL NOTICES.

34.—ENGLAND.—*East Coast.—Thames River Entrance.—North Foreland Light—Intended Alteration in Character.*—In May, 1880, the light will be altered to an *occulting* light, suddenly eclipsed once *every half-minute* for an interval of *five seconds*, and then, as suddenly, re-appearing with full power. Further notice will be given.

35.—ENGLAND.—*The Downs.—Alteration in Character of the N.E. Goodwin Buoy.*—This is now one of *Courtenay's Automatic Buoys;* position as heretofore.

36.—ENGLAND.—*South Coast.—Plymouth Sound.—Plymouth Breakwater Light.—Intended Alteration in Colours and Character.* —In May, 1880, the colour will be changed from red to *white* seaward, and from white to *red* over the anchorage—thus, showing

white between the bearings W. by N. ¼ N. and S.W. ¼ W. on a line with the Melampus buoy, and *red* over the anchorage. The character will be changed from fixed to *occulting*, whereby the light will be suddenly eclipsed once *every half-minute* for an interval of *three seconds*, and then, as suddenly, re-appearing with full power. Further notice will be given.

37.—IRELAND.—*South Coast.—Queenstown Harbour.—Particulars of Buoyage.*—The following particulars have been issued :—

HARBOUR ROCK EAST BUOY is *conical*, surmounted by a cage, chequered red and white, and marked 1 on four sides.

HARBOUR ROCK WEST BUOY is *conical*, chequered black and white, but without cage or number.

TURBOT BANK EAST BUOY is *conical*, surmounted by a cage, painted red and white in vertical stripes, and marked 2 on four sides.

TURBOT BANK WEST BUOY is *conical*, painted black and white in vertical stripes, but without cage or number.

WITHIN THE HARBOUR, the western banks are marked by *conical* buoys, painted red, and marked on four sides from 3 to 8 in white figures, 16 inches long. Nos. 9 and 10 are *can* buoys floating on their sides, painted red and marked in white. There is no No. 11. The buoys marking the eastern banks are *conical*, painted black, and marked 12 to 17 in white figures on four sides. The fairway buoys are *conical*, painted black with white tops, and marked on two sides F 1 to F 8.

The five following buoys have been replaced in their proper positions :—

No. 6 RED BUOY now lies with Black rock perch, S.E. by E. ½ E., distant 7¼ cables.

OUTER SPIT BUOY, No. 8, now lies with Spit bank lighthouse, W.N.W., distant 2½ cables.

FAIRWAY BUOY, No. 1, now lies with Black rock perch, S.E. ½ E., distant 8¾ cables.

FAIRWAY BUOY, No. 2, now lies with Black rock perch, S. ½ W., distant 6 cables.

FAIRWAY BUOY, No. 3, now lies with Spit bank lighthouse, W. by N. ½ N., distant 4½ cables.

Bar rock buoy is a large *cask* buoy, painted red and white in stripes, and marked *Bar Rock*.

Inner spit buoy and the Buoy between Spit bank lighthouse and Middle spit buoy (No. 9) are *can* buoys floating with the flat tops nearly upright, painted red, and marked S 2, S 3.

The buoy off Copper point (north-eastward of fairway buoy, No. 4) is a *can* buoy floating upright, painted black and marked C 4.

The buoy off White point is a *can* buoy floating upright, painted black, and marked W 5.

The buoy off Shawn-more rocks is a *can* buoy floating upright, painted black, and marked S 6.

The fairway buoy off Monkstown has been removed. *Variation*, 23° *W*.

38.—North Sea.—*Jade River.—Williamshaven.—Light near Torpedo Harbour.*—On the east side of entrance to the Torpedo harbour, about 220 yards westward of the south mole head, at Williamshaven. It is a *fixed white* light, elevated 13 feet above high water, and visible between the bearings N. 84½° W. (through north) and N. 80½° E., from a distance of 3 miles.

Note.—This light is distinguished from the white lights at the harbour entrance and canals by being of less elevation.

39.—North Sea.—*Maas River.—Bokke Gat.*—(1.) *Position of Outer Light-Vessel.*—Now moored on the north side of the fairway, close southward of Black buoy, No. 3, in 18 feet water. It is a *fixed white* light, elevated 16 feet above the sea, and visible from a distance of 9 miles. Position, lat. 51° 52′ 5″ N., long. 3° 58′ 0″ E.

(2.) *Position of Inner Light-Vessel.*—The Inner light-vessel of the Bokke gat is now moored in 23 feet water, on the northern side of the fairway, near the junction of Bokke and Noorder gats, taking the position of the Red buoy, which has been removed—and northward of the position of Noorder Pampus light-vessel, which has been withdrawn. It is a *fixed white* light, elevated 16 feet above the sea, and visible from a distance of 9 miles. The light-vessel, painted red, has one mast. Position, lat. 51° 51′ 50″ N., long. 4° 1′ 25″ E.

(3.) *Particulars of Horned Heads* (*Hoornsche Hoofden*) *Light.*—On the north shore of Haring Vliet, and is exhibited from a watch-house on the south point of the dyke. It is *fixed*, and shows *white* between the bearings S.E. ½ E. and N.N.E. ½ E.; and *red* between N.N.E. ½ E. and N.W. ¼ W. Position, lat 51° 48′ 20″ N., long. 4° 11′ 5″ E. *Variation*, 16½° *W.*

40.—BALTIC ENTRANCE.—*The Kattegat.*—*Læso Island.*—*Intended Light on North Rönner.*—In the spring of 1880, from a lighthouse erected on North Rönner, 3¼ miles northward of Holmen point, north-west side of Læso island. It will be a *fixed white* light, varied *every minute* by a *red flash*, elevated 52 feet above the sea, and visible from a distance of 12 miles. The lighthouse, 46 feet high, is constructed of granite. Position as given, lat. 57° 21′ 30″ N., long. 10° 55′ 30″ E. The *fog-signal* will be established at the lighthouse. It will be a Syren, worked by a caloric engine, which during thick and foggy weather will give *three powerful blasts* in quick succession *every two minutes.*

41.—BALTIC ENTRANCE.—*The Kattegat.*—*Intended Alteration in Trindelen Light.*—In the spring of 1880, the fixed light exhibited from Trindelen light-vessel, north-eastward of Læso island, will be discontinued, and instead thereof, a *white* light will be exhibited, showing a *flash* every *thirty seconds.*

42.—BALTIC ENTRANCE.—*The Kattegat.*—*Intended Alteration in Kobber Ground Light.*—In the spring of 1880, the three fixed lights exhibited from Kobber ground light-vessel, south-eastward of Læso island, will be discontinued, and instead thereof, *one fixed white* light will be exhibited.

43.—BALTIC ENTRANCE.—*The Kattegat.*—*Intended Alteration in Anholt Knobben Light.*—In the spring of 1880, the fixed light shown from Anholt Knobben light-vessel, eastward of Anholt island, will be discontinued, and instead thereof, a *white* light will be exhibited, showing *two flashes* in quick succession *every minute*, The *fog-signal* will be a syren, worked by a caloric engine, which during thick and foggy weather will give *three powerful blasts* in quick succession *every two minutes.*

44.—BALTIC.—*Stor Ström.*—*Siælland.*—*Leading Lights at Ore.*—There are two lights, shown from poles.

The Low light is *fixed white*, elevated 9 feet above the sea, and visible from a distance of 4 miles. This light is only shown in a south-westerly direction. Position, lat. 55° 0′ 20″ N., long. 11° 52′ 30″ E.

The High light is *fixed white*, elevated 31 feet above the sea, and visible from a distance of 4 miles; it bears N. 48° E. from the low light distant 34 yards.

Note.—These lights kept in line bearing N. 48° E. lead westward of Kalva spit, and over Masnedö flat in 12 feet water. *Variation*, 12° *W*.

45.—Baltic.—*Stor Ström* — *Falster*. — *Light at Orehoved.*— Shown from a pole on the pier head at Orehoved, north coast of Falster. It is a *fixed red* light, elevated 31 feet above the sea, and visible from a distance of 4 miles. Position, lat. 54° 57′ 35″ N., long. 11° 51′ 25″ E.

46.—Baltic.—Prussia.—*Intended Fog-Signal at Dars Point.*— Near Dars point (Darsserort) lighthouse. During thick and foggy weather, a gun will be fired *twice* at intervals of from *four to five seconds* every *ten minutes*.

47.—Baltic.—*Swinemünde* — *Establishment of Time Ball.*— Situated 120 yards eastward of the tower of the new Navigation house. The ball will be dropped twice daily at the following times, viz.:—At Noon—Mean time at Swinemünde. At Noon — Greenwich mean time — Equivalent to 0h. 57m. 6s. p.m. mean time at Swinemünde. The time ball, diameter 5 feet, and of a black colour, will be hoisted half-mast 10 minutes before each time-signal, and close up (115 feet above the ground) 3 minutes before each time-signal. If the ball does not fall exactly at the time appointed, a red ball will be hoisted, within 3 minutes after the delayed signal, close up on one of the wire ropes supporting the framework, and kept hoisted for 5 minutes—The time of the ball dropping is then made known by posting it up at the framework, or other appropriate plan. If the time ball has not dropped at all, the red ball will be hoisted half-way up the framework within 3 minutes after the appointed time, and kept so, until the time-ball has been lowered down. If from any disturbing cause, the succeeding time-signal may probably be delayed, the red ball will

be hoisted half-way up the framework, and kept so, until dropping the ball at the exact time may be considered as certain. Position of time ball, lat. 53° 54′ 30″ N., long. 14° 16′ 30″ E.

Note.—The position of Swinemünde principal lighthouse (on which the position given for the time-ball is based), is by recent determinations, in lat. 53° 55′ 3″ N., long. 14° 17′ 19″ E.

48.—Baltic.—*Bornholm.—Intended Light on Due Odde.*—In the spring of 1880, from a lighthouse erected on Due Odde, 1,717 yards from the south point of Bornholm. It will be a *fixed white* light, showing a *white flash* every *one and a-half minute,* elevated 155 feet above the sea, and visible from a distance of 20 miles. The lighthouse, 100 feet high, is constructed of granite. Position, lat. 55° 0′ 15″ N., long. 15° 4′ 40″ E. *Variation*, 10° *W.*

49.—Baltic.—*Bornholm.—Intended Light on Due Odde Point.* —In the spring of 1880, from a lighthouse erected on Due Odde point, near the south extreme of Bornholm. It will be a *fixed white* light, elevated 52 feet above the sea, and visible from a distance of 12 miles. The lighthouse, 41 feet high, and constructed of granite, is situated S. 18° W. from the lighthouse on Due Odde, distant 1,147 yards. The *fog-signal* will be established near Due Odde point lighthouse. It will be a syren, worked by a caloric engine, which, during thick or foggy weather, will give *one powerful blast* every *two minutes.*

50.—Baltic.—*Bornholm.— Intended Fog-Signal at Hammar Point.*—In the spring of 1880, at Hammeren (Steilebierg) lighthouse, near Hammar point, north extreme of Bornholm. It will be a syren, worked by a caloric engine, which, during thick and foggy weather, will give *two powerful blasts* in quick succession *every two minutes.* Further notice of the date on which these several lights and syrens will be established, and alterations made, will be published in due course.

51.—Baltic.—*Russia.—Particulars of Backofen Light.*—The light (flashing) is visible seaward from the bearing N. 7½° E., to the land northward of the light. The lighthouse, circular in shape and built of stone, is, with keeper's dwelling adjoining, painted red. Position, lat. 57° 11′ 45″ N., long. 21° 25′ 5″ E. *Variation*, 6½° *W.*

63.—MEDITERRANEAN.—*Gulf of Kos.—Lights at Budrûm.*—They will be two *fixed white* lights, placed vertically, and visible from a distance of 10 miles.

64.—MEDITERRANEAN.—*Karamania.—Lights on Kastelorizo Islet.*—They will be *fixed white* lights, placed vertically, and visible from a distance of 10 miles.

65.—MEDITERRANEAN. — *Khios Strait.* — *Chesmeh.—Light on Kezil (Ayasmatha) Point.*—At the south side of approach to Chesmeh (Chesmé). It is a *fixed white* light, elevated 65 feet above the sea, and visible from a distance of 10 miles. Position as given, lat. 38° 19′ 55″ N., long. 26° 17′ 45″ E.

Note.—Kaloyeri reef bears about N.W. by W. ½ W. from the lighthouse, distant about 8 cables.

66.—MEDITERRANEAN.—*Mityleni Channel.—Lights at Makaronia.*—Shown at 50 yards from the extremity of the point, northern side of Kabakoum bay. Two *fixed white* lights, placed vertically, elevated 52 feet above the sea, and visible from a distance of 10 miles. Position approximate, lat. 39° 8′ N., long. 26° 51′ E.

67.—MEDITERRANEAN.—Lighthouses as undermentioned are in course of construction, from which it is intended that lights will be exhibited as follows:—

(1.) *Adriatic.—Albania.—Samana Point.*—Two lights near Sememi river entrance. They will be *fixed white* lights, placed vertically, and visible from a distance of 10 miles. Position approximate, lat. 40° 47′ N., long. 19° 20′ E.

(2.) *Light at Tripoli.*—Will be a *revolving* light, visible from a distance of 15 miles.

(3.) *Light at Ben-Ghazi.*—Will be a *revolving* light, visible from a distance of 15 miles.

(4.) *Light at Dernah.*—Will be a *fixed* light, visible from a distance of 14 miles.

(5.) *Light at Gavdo Island.*—On the summit of Gavdo island (southward of Candia or Crete), a *revolving* light, visible from a distance of 25 miles.

(6.) *Candia or Crete.* — *North-east Coast.* — *Light on Cape Sidero.*—Will be a *revolving* light, visible from a distance of 16 miles.

(7.) *Crete.—Lights on Cape St. John.*—Two lights on cape St. John (Aghios Joannis or Spinalonga), north-east coast of Crete. They will be *fixed white* lights, placed vertically, and visible from a distance of 10 miles.

(8.) *Karamania.—Light at Alaya.*—A *fixed white* light, varied by *flashes every minute*, visible from a distance of 15 miles.

68.—Black Sea.—*Odessa.—Intended Lights on Breakwater.*— The construction of a breakwater has been commenced in Odessa road, extending in a W. by N. and E. by S. direction, between the Quarantine and Commercial harbours; and from it lights will be exhibited as follows:—At the east end, two *fixed green* lights, placed vertically, the upper light will be elevated 24 feet above the sea. At the west end, two *fixed white* lights, placed vertically, the upper light elevated 24 feet above the sea. They cannot be exhibited in very bad weather.

69.—Black Sea.—*Odessa.—Lights near Quarantine Mole Head.* —Another *fixed red* light is exhibited; so that *three* fixed *red* lights, placed vertically, are now shown.

70.—Black Sea. — *Trebizond. — Alteration in Character of Kalmek Point Light.*—The fixed light exhibited from the fort on the summit of Kalmek point is discontinued, and instead thereof a *revolving* light exhibited, with intervals of *one minute*, and visible from a distance of 16 miles.

71.—Black Sea.—*Amastra.—Alteration in Character of Light.*— The fixed red light is discontinued, and instead thereof a *flashing* light exhibited, showing a flash every *ten seconds*, and visible from a distance of 16 miles.

72.—Black Sea.— *Cape Kefken. — Lights on Kirpen Islet.*— Two lights are now exhibited 65 yards from the western extremity of Kirpen islet (cape Kefken), and 250 yards from the shoal ground that extends in that direction. They are *fixed white* lights, placed vertically; the upper light is elevated 98 feet above the sea, and visible from a distance of 10 miles. Position, lat. 41° 13′ 55″ N., long. 30° 17′ 45″ E.

73.—Black Sea.—*Roumelia.—Intended Light at Cape Emineh.* —It will be a *flashing* light at intervals of *ten seconds*, visible in clear weather from a distance of 20 miles.

74.—BLACK SEA.—It is intended shortly to exhibit the following lights on the north coast of Asia Minor :—

(1) *Lights on Vona Point*—Two *fixed white* lights placed vertically, and visible from a distance of 10 miles. Position approximate, lat. 41° 7′ N., long. 37° 48′ E.

(2) *Lights on Tchiva (Iris) Point.*—Two *fixed red* lights, placed vertically, and visible from a distance of 10 miles. Position approximate, lat. 41° 21′ N., long. 36° 39′ E.

(3) *Lights on Cape Bafra (Halys Point).*—Two *fixed white* lights placed vertically, and visible from a distance of 10 miles. Position approximate, lat. 41° 43′ N., long. 35° 58′ E.

75.—*North Atlantic Ocean.—Azores.—St. Michael (San Miguel).—Ponta Delgada.—Destruction of Light Apparatus.*—With respect to the red light near the extremity of the breakwater, the lighting apparatus was destroyed by the sea during a storm on the 9th December, 1879 ; and the light will not be re-established in less than two months. Probably a temporary light will be exhibited until the repairs have been effected.

76.—*Africa.—East Coast.— Zanzibar Harbour. — Prohibited Anchorage near Telegraph Cables.*—To afford protection to the shore ends of the two telegraph cables in Zanzibar harbour, which are laid down from Bawi island to Rás Shangani, the following restriction as to anchoring in their vicinity, is to be complied with :—The general line of direction of the telegraph cables is indicated by the beacon (marked " cable ") on Rás Shangani in line with the white mark on the English jail : and as one of these cables is laid on each side of this line of direction, mariners are cautioned on no account to anchor between Bawi island and Rás Shangani, within 200 yards on either side of the line indicated by the beacon and white mark.

77.—JAPAN.— *Kiusiu.—West Coast.—Pallas Rocks.*— Adopted position, and description of Pallas rocks (Tori sima), lying northwestward of Mé-sima group, by Commander Aldrich, H.M. Surveying vessel *Sylvia.* Pallas rocks are three in number ; the two southern rocks are close together, the third (40 feet high) and smallest lies N.N.E. 4 cables from the South and largest rock. South rock, 60 feet high, is about one-third of a cable in length, and from the

southward has the appearance of a pyramid; from the northward, it shows as a sharp ridge with somewhat steep sides. Under favourable conditions, it is accessible on the northern side. Soundings of not less than 37 fathoms were obtained round the rocks at the distance of from one to seven cables; the bottom generally consisting of coarse sand, coral, and shells. Position, lat. 32° 14′ 36″ N., long. 128° 6′ 18″ E., depending upon Tetegatake summit (Goto islands), being in 128° 40′ 55″ E.—The flood stream (neaps), during the *Sylvia's* visit, was observed to set slowly to the north-west, with a light easterly wind.

78.—JAPAN.—*Nipon Island.—Tsugar Strait.—Sunken rock off Siriya Saki.*—Information relative to the existence of a sunken rock lying E. by N. distant about two miles from Siriya Saki lighthouse, the north-east extremity of Nipon island. This danger (*Charybdis rock*) was seen to break twice heavily by H.M.S. *Charybdis*, when passing Siriya Saki, on 20th August, 1879, the sea at the time being smooth with moderate easterly swell.—Position approximate as given, lat. 41° 26′ 45″ N., long. 141° 31′ 50″ E.

79.—SOUTH AUSTRALIA.—*Gulf of St. Vincent.—Light at Edithburgh.*—A *white* light is now exhibited on the Outer End of the jetty, visible from a distance of about five miles.

80.—AUSTRALIA.—*Bass Strait.—King Island.—Light at Currie Harbour.*—To be shown on 1st March, 1880, on the south side of Currie harbour, West Coast of King island. It will be a *flashing* light, showing *five* flashes and eclipses alternately in a *minute*, elevated 150 feet above the sea, and visible from a distance of 17 miles. Arc of illumination, 180°—from New Year islands on the north, to Cataraque point on the south. The lighthouse, 70 feet high, constructed of iron, with central tube for staircase, and supported on six iron columns, is situated on an eminence about 80 feet high. Position as given, lat. 39° 56′ 45″ S., long. 143° 51′ E.

Caution.—Mariners approaching King island are specially warned to note the distinctive features between Currie harbour flashing light and Cape Otway revolving light, on the coast of Victoria, viz.:—Currie harbour light shows *five* flashes *every minute;* but Cape Otway light attains its greatest brilliancy *once every minute.*

81.—*New Zealand.—Middle Island.—South-East Coast.—Otago Harbour.*—Information relating to the bar and entrance to the harbour. According to a survey made in March, 1879, the least water on the bar of the harbour, with the leading lights in line bearing S.S.W., was 15 feet at low water ordinary spring tides. The green light open north of the white light, and bearing S. by W. ½ W., leads across the bar in 16 feet. The least water found in the north channel was 19 to 20 feet.

Note.—Within the bar the channel (on entering) is marked by red buoys and beacons on the starboard hand, and black buoys and beacons on the port hand. The light-vessel is moored S.W. by S. 2 cables from the first red beacon. According to the survey above referred to, the lighthouse on Tairoa head is situated N. 7° E. 190 yards from the position heretofore assigned to the signal staff.

Caution.—It should be observed that the depths on the bar of Otago harbour are subjected to change. For some years there was reported to be not less than 18 feet at low water, but the great tidal wave of August, 1868, suddenly reduced the depths to 12 feet. After that date the bar slowly resumed its original depth, so that in February, 1871, there was stated to be again 18 feet in the channel across it, and according to information published by the local authorities, the same depth was maintained in 1876. The depths in the north channel are also reported subject to change. *Variation*, 17° *E.*

82.—United States.—*Georgia.—Mouth of Savannah River.—Buoyage off Tybee Island.*—An automatic signal-buoy, painted with black and white perpendicular stripes and marked with the letter T, is now moored in 6 fathoms water, in range with Tybee light-house and beacon, and about 6 miles distant. It gives blasts of a whistle at short intervals. Bearings are as follows:—Tybee lighthouse and beacon, in range, W. by N. ¼ N.; Braddock point, N.W. by N. ⅜ N. The Tybee Knoll spit buoy may be distinguished by a bell placed upon it, which will be rung by the motion of the waves, and may be heard a sufficient distance from the buoy to enable vessels to use it as a turning-point. A first-class can buoy, painted red, No. 2½, is placed to mark a 10-foot lump, dis-

tant three-eighths mile from St. Michael's buoy, on the bearing E. by S. ¾ S.

83.—*North Atlantic.—Bermuda Islands.—St. David Island.—Fixed Light near St. David Head.*—As stated in *Nautical Magazine*, December number, 1879, p. 1066, the new *fixed white* light is established on Mount hill, about one-third of a mile south-west of St. David head, eastern end of St. David island.

SPAIN.—WEST COAST.—AROSA BAY.—The *Aviso a los Navegantes* gives the following account of sunken rocks in the bay :—

Con de Baixeu rock, with a depth of 7 feet water on it and 7 fathoms close around, lies about 1½ cables south of Sino del Mano shoal, on the west side of Arosa bay ; from this rock Arosa island lighthouse bears E. by S. ½ S. and Rua island lighthouse S.W.

Mascatino rock, with 4 feet over it and 5½ fathoms close around, is surrounded by seaweed nearly awash at low water; from the rock (which lies nearly midway between Sinal del Mano shoal and Cabio point) Arosa island lighthouse bears S.E. ¾ E., and Rua island lighthouse S.W. by S. *Variation*, 21° *W*.

CHARTS, &c., PUBLISHED BY THE HYDROGRAPHIC DEPARTMENT, ADMIRALTY, IN NOVEMBER AND DECEMBER, 1879.

No.		*s.*	*d.*
2619	Australia, south coast :—King George sound and Princess Royal harbour	2	0
1038	Australia, west coast :—Warnbro sound	1	6
648	Africa, east coast :—Delagoa bay to Masangzani bay (plans, Sofala river, Inhambane river)	2	6
874	Japan, Tsu Sima :—Ajiro bay, Itsuhara and Asu harbours	1	0
896	Africa, west coast :—Donkin bay to Milkbosch point (plans, Hondeklip and Roodewall bays)	2	6
1771	South Atlantic Ocean :—St. Helena island ...	2	6
457	Japan :—Aburatani harbour	1	0
878	Liu Kiu islands Oö-sima group (plans, Naze harbour ; Oö-sima strait)	1	6

No.		s.	d.
1037	Australia, west coast:—Hamelin bay, Flinders bay	1	6
57	India, west coast:—Rajapur bay and Viziadurg harbour	2	6
875	Cochin China, Tong-King gulf:—Delta of the Song-Ka. Pak-Hoi anchorage. Guie-Chau island ...	1	6

Books.

	s.	d.
Sailing directions for the Bristol Channel, third edition, 1879	2	6
Australia Directory, vol. 2, comprising the east coast, Torres strait, and Coral sea. Also, the gulf of Papua, eastern coasts of New Guinea, and Louisiade archipelago, third edition, 1879 ...	5	0

Hydrographic Notices recently Published by the Hydrographic Office, Admiralty, 1879.

No. 26.—West India Pilot, Vol. II., Notice 7; off-lying banks, and deep sea soundings in the vicinity of Bermuda islands.

No. 27.—West Coasts of France, Spain and Portugal, Notice 8; information relating to sunken rocks in Arosa bay, west coast of Spain.

No. 28.—Pacific Ocean, Notice 49; information relating to Lau or Eastern group of the Fiji islands.

No. 29.—China Sea Directory, Vol. III., Notice 11, China, east coast; information relating to Wên-chau river and approaches.

No. 30.—West India Pilot, Vol. II., Notice 8; information relating to Jamaica.

OUR OFFICIAL LOG.

Official Inquiries at Home, 1880.

(*This List is completed to the* 18*th of each Month.*)

458. *Forest Belle*, barque; built of wood at Quebec in 1874; owned by J. W. Holmes, of Liverpool; tonnage, 1,115; New York to Cork; wheat, partly in bulk and partly in bags; abandoned in the North Atlantic, October 31, 1879. Inquiry held at Liverpool, January 7, 1880, before Raffles, Stip. Mag.; Castle, Forster, and Parfitt, N.A. Master and officers free from blame, and were perfectly justified in abandoning the vessel.

Official Inquiries Abroad.

429. *Eirene*, s.s.; lost at Barge Point, Labrador, September 30, 1879. Inquiry held at St. John's, New Brunswick, October 25, 1879. Casualty due to a dense fog, and to the action of a very powerful current. Master free from blame.

434. *Ingliss*, brigantine; driven ashore in Brunswick River during an easterly gale. Inquiry held at Sydney, September 22, 1879. No evidence adduced to found a charge against the master.

435. *Franze*, schooner; lost near Shellharbour in a gale of wind. Inquiry held at Sydney, September 22, 1879. Master exonerated from any blame.

436. *Bertha*, schooner; lost near Wollongong in a gale of wind. Inquiry held at Sydney, September 22, 1879. No blame attached to master.

437. *Phœbe*, s.s., and *Saxonia*, s.s.; in collision in Newcastle harbour, September 3, 1879. Inquiry held at Newcastle, September 27, 1879. Casualty due to an error of judgment on the part of the master of *Phœbe*, who was cautioned.

438. *Willunga*, steam dredger; damaged by the falling in of the crowns of the furnaces, August 26, 1879. Inquiry held at Port Adelaide, October 22, 1879. Casualty due to carelessness on

the part of the engineer in charge. Certificate suspended for six months.

439. *Lady Octavia*, ship, and *Champion*, s.s.; in collision off the Capes of the Delaware, November 7, 1879, whereby loss of life ensued. Naval Court held at Philadelphia, November 12, 1879. Court held that the master and crew of the *Octavia* were not to blame for the accident, but as the survivors of the *Champion* failed to appear to give evidence, no opinion could be formed as to the cause of it.

440. *Java*, s.s.; stranded near the Port of Jeddah. Naval Court held at Jeddah, November 25, 1879. Master exonerated from negligence. Casualty due to a strong easterly current.

441. *Commodore*, s.s., and *Fawn* s.s.; in collision near Sydney, but no material damage took place. Inquiry held at Sydney, October 16, 1879. Master of *Commodore* guilty of misconduct in neglecting the 17th article of the Steering and Sailing Rules. Certificate suspended for one month.

442. *Galatea*, s.s., and *Darra*, s.s.; in collision in Sydney harbour, October 10, 1879. Inquiry held at Sydney, October 21, 1879. Accident caused by neglect of the 13th article of the Steering and Sailing Rules on the part of the master of the *Galatea*. Certificate suspended for one month.

443. *Prosper Colon*, schooner; stranded through missing stays while beating into Port Hacking. Master censured for going to sea without a windlass.

444. *Benares*, ship; stranded on the bar of Otago harbour, July 21, 1879. Inquiry held at Dunedin, September 3, 1879. Casualty due to the master of the tug slowing and stopping at a critical moment when crossing the bar, which gave the impression to the pilot and others on board that the hawser had parted. No blame due to officers or crew.

445. *Pohono*, barque; lost on Sandy Cay, Grand Bahama, October 13, 1879. Inquiry held at Nassau, October 23, 1879. Casualty due to a strong current setting on the bank.

446. *Olive Branch*, schooner; lost on a reef on the S.W. Point of Grand Bahama, October 12, 1879. Inquiry held at Nassau, October 28, 1879. Casualty due to master over-

rating the speed of his vessel, and the action of an easterly current.

447. *King Arthur*, s.s.; stranded at Inger Bournou, Sea of Marmora, November 19, 1879. Inquiry held at Constantinople, December 10, 1879. Master and mate both reprimanded for careless navigation.

448. *Messenger*, barque; lost on the Cape Farewell Sand spit, September 19, 1879. Inquiry held at Nelson, October 10, 1879. Master guilty of grave error of judgment.

449. *Arcturus*, barque; grounded off Maldonado, Rio Grande, November 4, 1879. Naval Court held at Monte Video. Master acquitted of blame.

450. *Kate McGregor*, ship; stranded at the entrance of Port Napier, September 6, 1879. Inquiry held at Napier, September 30, 1879. Accident attributable to an error of judgment on the part of the master.

451. *Lady Emma*, barque; stranded on a reef off Southport, N.Z., August 28, 1879. Inquiry held at Hobart Town, September 21, 1879. Master censured for his imprudence in not giving personal attention to the navigation when in proximity to known dangerous reefs.

452. *Claude Hamilton*, s.s., and *Eden*, barque; in collision in Port Philip Bay, August 22, 1879. Inquiry held by the Victoria Steam Navigation Board, September 3, 1879. Master guilty of gross misconduct in leaving the bridge when a vessel was approaching so closely as to risk a collision. Certificate suspended for two months.

453. *Shannon*, in tow of *Hercules*, and *Gauntlet*, in tow of *Black Boy*; in collision in the neighbourhood of Humbug Reach, River Yarra, September 17, 1879. Accident due to an error of judgment on the part of the master of the *Hercules*, and of an omission on the part of the master of the *Shannon* to direct the *Hercules*' movements.

454. *Easby*, s.s., and *Undaunted*; in collision in Port Philip Bay, September 24, 1879. Inquiry held by the Victoria Steam Navigation Board, October 9, 1879. The Board did not bring any charge against the master of the *Easby*.

455. *Girvan*, barque; grounded in Brisbane river, September 29, 1879. Inquiry held at Brisbane, October 24, 1879. Accident caused by an error of judgment on the part of the pilot in charge.

457. *Margaret Smith*, barque; wrecked on the reefs off Canoniers Point, November 20, 1879. Inquiry held at Mauritius. Accident due to the careless and ignorant navigation of both master and mate, whose certificates were suspended for twelve and six months respectively.

YELLOW FEVER AT RIO.—NOTICE TO SHIPOWNERS AND MASTERS. —The Board of Trade have received from Her Majesty's Consul at Rio de Janeiro, a report upon the subject of the epidemic of yellow fever at that port in the year 1878. The epidemic, which commenced in December, 1877, increased in intensity up to February, 1878, and did not abate until the end of the following month. It thus appears that the months of January, February, and March are those which are most unhealthy at the port. It further appears from the returns which accompany the report, that the death rate from yellow fever was much higher in the case of those persons who were not submitted to medical treatment upon the first manifestation of the symptoms. The Board of Trade desire, therefore, to impress upon masters the urgent necessity for at once sending to the hospital any seaman showing symptoms of yellow fever, instead of waiting until the disease has gained ground, and, by its progress, has rendered ineffectual remedies which may then be applied.—THOMAS GRAY, Assistant-Secretary, Marine Department.—By Order of the Board of Trade, December, 1879.

TAY BRIDGE.—NOTICE TO MARINERS NAVIGATING THE RIVER TAY.—The channel for passing the Tay bridge is indicated by 7 lights, the two outermost ones being red, and the centre ones white. These white lights are fixed in the centre of each span for the purpose of directing vessels to the deepest part of the channel and to avoid passing near the piers. The lights will be exhibited from sunset to sunrise, and all mariners are warned to steer their mast-head directly under the white light. The headway under

each white lamp at high water ordinary spring tides, averages 70 feet. During the day, round signal boards, 4 feet in diameter, indicate the position of the lamps on the bridge. There will also be exhibited at the north end of gap, 2 red lights placed vertically one above the other, indicating proximity to the sunken girders.—By Order, North British Railway, Tay Bridge, Dundee, January 12, 1880.

GENERAL.

New York Pilotage.—The following is an extract from the message to Congress by the Governor of New York :—"The laws relating to pilotage in the harbour of New York cause much complaint from those engaged in commerce. It is represented that the legal charge for piloting a large steamship in and out of that port is larger than the wages of the captain for the round European trip. If this be true a remedy is surely needed. The growing competition of other seaports for our vast foreign trade renders it imperative that the commerce of New York shall be relieved of all unnecessary burdens. The future prosperity of the State is largely dependent upon the continuance of our commercial supremacy, and no private interest should be permitted to interfere with that great object."

Hudson Bay, British N. America. — Change of Level in the Land.—Decrease in Depth of Water.—The east coast of Hudson Bay is reported to be undergoing very considerable changes in its level. Since the posts of the Hudson's Bay Company were established at the mouths of the various rivers, there has been an increasing difficulty in approaching them with large craft ; and this elevation is estimated to amount to between 5ft. and 10ft. within the last hundred years. The same changes have been observed on the west coast of the bay, at the mouth of the Nelson and Hayes rivers, near which is an island called Mile Lands, now several feet above high water, which, within the memory of man, was always submerged at flood tide.

UNITED STATES.—GULF OF MAINE.—*Tidal Currents at the Entrance.*—The Gulf of Maine extends between latitudes 41° and 44° N., and between longitudes 66° and 70° W. For the set and drift of the tidal currents at the entrance to the gulf, "rules and tables for the use of navigators, have been deduced by Professor Henry Mitchell, U.S. Coast Survey, from observations made by the Coast Survey during the summer of 1877, at eight stations between Nantucket Shoals and Cape Sable. These observations show that the tidal currents of this locality are of sufficient strength to render their consideration in the reckoning, especially of sailing-vessels, highly important. The simplest statement that can be made respecting these currents is the following:—

"*General Rule.*—Along the whole line between Nantucket Shoals and Cape Sable Bank the ebb current runs southwardly during the first four and a-half hours after the *southing* or *northing* of the moon; and the flood current northwardly from the sixth to the eleventh hour after the *southing* or *northing* of the moon. The time of turning on George's Bank corresponds nearly with the time of high or low water at Boston and Portland; but in the channel to the westward of the Bank it is later, and, to the eastward, earlier."

[We may remark that the tables to which reference is made in the above observations are to be used in conjunction with the "Tide Tables for the Atlantic Coast," issued from the U.S. Coast Survey Office; and it appears to us that these tables are as essential for the navigation of the American coast as are the Admiralty Time Tables for our own. How many of our seamen know of their existence?—ED. *N.M.*]

THE

NAUTICAL MAGAZINE

FORTY-NINTH YEAR.

VOLUME XLIX.—No. III.

MARCH, 1880.

OUR COLONIAL EMPIRE.*

BY THOMAS BRASSEY, M.P.

YOU have asked me to address you this evening on the subject of our Colonial Empire. It is indeed a noble theme. Would that it were in my power to treat it worthily! In the course of many wanderings upon the seas I have visited Newfoundland; I have seen the magnificent scenery of the St. Lawrence, and the thriving cities of Montreal, Quebec, and Toronto. In a recent voyage round the world we touched at Hong Kong, Singapore, Aden, Malta, and Gibraltar. Within the memory of the present generation Hong Kong was a barren rock, from which a band of 600 pirates set forth on their lawless expeditions. It has now 124,000 inhabitants, including a civil European population of 3,000 persons, and the annual imports of English merchandise alone are not less than 3½ millions sterling. At Singapore, where the English population numbers not more than 1,400, we have established a trade of collection and distribution not inferior in importance to that carried on from Hong Kong. The native vessels from every creek and harbour of

* Address delivered before the Bradford Chamber of Commerce, January 21, 1880.

the Eastern Archipelago collect together at the Straits Settlements, and are supplied from our well-managed counting-houses with European manufactures. Aden, which may be compared to a huge cinder lying on the arid coasts of thirsty Arabia, has become, under the beneficent influence of British administration, another great emporium of trade. Its commerce extends on the east to the shores of the Persian Gulf, and southwards to Zanzibar, and far down the eastern shores of Africa. Mocha has been deserted by the Arab merchants since we have established ourselves at Aden. An average number of 800 laden camels daily enter the gates, and the total exports and imports are nearly three millions sterling a year.

I must not dwell further on personal recollections. I have spoken only of places which I have myself had the privilege of visiting; but it is not necessary to draw upon personal recollections in order to appreciate the fact that, without our Colonies and our foreign possessions, England would fall to the second rank in the family of nations. Maritime States have in all ages of the world exhibited the same desire to establish colonies. Phœnicia, Carthage, and Greece were great colonising States in ancient times. In the Middle Ages the Lion of St. Mark exhibited the symbol of Venetian power over the whole coasts of the Mediterranean. The discoveries of Vasco do Gama opened an era of incredible prosperity for Portugal; and Spain was not less indebted to the discoveries of Columbus. We have followed those illustrious pioneers of colonisation; but we have known better how to use our new sources of wealth, and our conquests have been more enduring.

Trade, as we know, tends to follow the flag; and, during the period of commercial depression through which we have lately passed, and from which we are now very gradually emerging, it has been in the British possessions alone that the export trade has displayed any growth and elasticity. British India now takes a larger quantity of our produce than any other country. In 1869 it only occupied the third place. In a paper by Dr. Forbes Watson, read at the Colonial Institute in February, 1878, a comparison is made of our export trade in 1876 and 1869. I propose bring the figures down to 1878, the last year included in the

Statistical Abstract. The figures disclose a significant change in the direction of our external trade. While the exports to foreign countries had risen from £141,900,000 in 1869 to £195,700,000 in 1872, and had fallen again in 1878 to £126,611,000, our Colonial trade has steadily grown in the same interval from £48,000,000 to £66,237,000, or from 25·3 per cent. to 34·4 per cent. of our total commerce.

When we pass from the aggregate figures to examine our Colonial trade in detail, we discover additional evidences of its great importance to the industrial prosperity of our country. The populations of the British Empire in the parts beyond the seas are, in proportion to their numbers, by far the most extensive consumers of our manufactures. It appears, from a table prepared by Mr. Frederick Young, that the annual consumption of our merchandise per head is represented by the following figures:—United States, 7s.; Germany, 9s. 2d.; France, 7s. 8d.; North American Colonies, £2 2s. 9d.; Australia, £8 10s. 8d. A more elaborate analysis, by Dr. Forbes Watson, brings out this striking result, that Australia actually consumes, in proportion to its population, a larger quantity of English manufactures than we require ourselves.

Our Colonial trade is the more valuable because, as Dr. Forbes Watson points out, it is largely composed of articles in an advanced stage of manufacture. Of our exportations of apparel, blankets, flannels, books, cutlery, and other articles of domestic consumption, the Colonies take £16,800,000, or about 70 per cent. of the total exportation. The proportion in 1869 did not exceed 58 per cent. Of the cotton trade, which forms about one-third of our total exports, two-fifths were taken by the British possessions. Between 1869 and 1876 they increased their consumption of our goods by £6,300,000 while our exportations to foreign countries diminished by £4,500,000. Not only was the aggregate quantity increased, but the goods were more highly finished than those we supply to many foreign countries. The Colonies take 40 per cent. of finished cotton manufactures; they take only 21·9 per cent. of cotton yarns. They take 23·4 per cent. of our woollen and worsted manufactures, and only ·3 per cent. of yarn. They take 40·4 per cent. of manufactured, and

only 3·6 per cent. of pig, iron. They take 17·7 per cent. of wrought and unwrought steel, and 40·6 per cent. of our exportations of hardware and cutlery, and 53·2 per cent. of our exports of implements.

Having shown the importance of our Colonial trade, let us turn to the growth of the Colonies themselves. The statistics of New Zealand have recently been collected by Sir Julius Vogel. In the fifteen years, 1861—1876, gold was exported of the value of £32,117,000, and wool of the value of £27,719,000. Since 1870 a thousand miles of railway and 2,300 miles of road have been constructed, 3,260 miles have been added to the telegraph wires, and 90,000 emigrants have been introduced. I may complete this statement by quoting from a speech of Sir James Fergusson, at a Meeting of the Colonial Institute, in March, 1877. Referring to the successive results of the public works policy of Sir Julius Vogel, he said that the population had increased from 237,000 in 1869, to 400,000 in 1876; and the value of the wool annually exported, from £1,771,000, to £3,396,000. The revenue had risen from £1,787,000 in 1867 to £3,500,000 in 1876. The rise in the value of private property has been enormous; and he affirmed, from the experience of his high official connection with the Colony, that all this was no ephemeral prosperity, but a final, solid, and enduring progress.

Wool is the staple trade of New South Wales. The number of sheep has increased ten-fold in ten years, the number in 1876 exceeding 24½ millions. South Australia with only 237,000 inhabitants has six millions of sheep, and exports nearly £5,000,000 of produce annually. More than a million acres are under wheat cultivation. Wheat is the great staple of the Colony, and it fetches the highest price in the world. Queensland, though founded so recently as 1859, has a population of 200,000 scattered over her 430,000,000 of acres. Upwards of 700 miles of railway have been made. The general exports in 1876 amounted to £3,740,000. Between 1860 and 1875 the exports of gold from the Colony amounted to £7,000,000.

The Statistical Abstract prepared by Mr. Giffen furnishes ample means for comparing our own possessions with foreign countries.

In 1875 the average yield of wheat per acre was 14·7 bushels in New South Wales, 15·5 in Victoria, 12 in South and Western Australia, 31·5 in New Zealand, 22 in the Province of Ontario in Canada, 12·3 in the United States, 5·5 in Russia.

Canada a century ago contained less than 150,000 people; it has now four millions of inhabitants. Eighteen million acres are already under cultivation, and the great prairie or corn-growing region is at least a thousand miles square. It is intersected by streams described, in the glowing language of Lord Dufferin, as beautiful and varied in their scenery, fervid in the volume of their waters, and flowing for their entire length through alluvial plains of the richest description. Professor Maconn, a botanist, recently commissioned to investigate the subject, has reported that no less than 160,000,000 acres are available in this region alone for farming and grazing, and that one-half of this area was considered fit for cultivation. So destitute of population is this vast region, that it has been estimated by Mr. Sandford Fleming that not more than 20,000 or 30,000 inhabitants can be found within a very considerable distance of any part of the 3,000 miles of railway which have been projected to unite the oldest provinces of the Dominion with British Columbia.

"Such," says Mr. Young in summing up these marvellous statistics of our Colonial development, "such is that British Empire, which has been so truly described by Lord Carnarvon as the most magnificent picture of administration that the labours of man ever created, or the eyes of man have ever seen."

We have seen the importance of the Colonies as the consumers of our manufactured products; they are not less essential to us for the supplies of food which they furnish to the teeming population of these islands. Mr. Bourne has shown that we cannot expect a material increase in the life-sustaining abilities of the land. Half of our food already consists of foreign importations. It has been estimated by Mr. Bourne that the demand for imported food and raw material will increase every year by considerably more than six millions sterling. We must proportionately increase our exports in order to pay for these ever-growing importations. We have seen the stagnation in the Continental demand, and the

growth in the consumption of our goods in our own possessions. If some of that capital so recklessly squandered in mushroom States had been carefully and gradually expended in our own Colonies, the investors would have obtained a steadier return, and the commerce of this country would have received a more lasting benefit. The Colonies offer an inviting field both for the industrious labourer and the small capitalist. In our own country there is already an ample population, and the openings are few for men of moderate resources. Men without capital, even when gifted with abilities beyond the average, experience a delay of years before they can cover the ordinary cost of living from a professional or a commercial income.

Mr. Bourne, in his recent paper, has urged the duty of colonisation, both on economic and on still higher grounds. By conquest, by discovery, and from motives of philanthropy, we have appropriated a wide space upon the earth. We cannot evade the responsibilities of our acquisitions. We must give to these countries the freedom that we enjoy, the commerce and the agriculture that we have organised, the civilisation under which we live, and the religion with which we ourselves are blessed. It is only by emigration that this beneficent mission can be accomplished.

We have now passed in review some of the salient facts of our Colonial development. We have just reason to be proud of our wide and growing Empire beyond the seas. It may not always be possible to preserve a common centre for such an Empire, although we have simplified our task to the utmost by yielding to the Colonies an absolute independence in their internal affairs; but in this we shall all agree that our noble confederation shall not be broken up for the sake of a paltry reduction in the Navy or the Army Estimates.

We have lately expended large sums for objects of very inferior importance to that of providing for the defence of our Colonies. Captain Colomb reminds us that we have erected costly barracks in the very centre of England in pursuance of a somewhat theoretical plan of military reorganisation, while all our coals for our war and merchant ships are left unprotected throughout the world.

In his "Recollections and Suggestions," that great statesman lately departed, Earl Russell, says: "It may be a matter of doubt whether or no to build up a Colonial Empire; but it is evident that if Great Britain gives up her supremacy from a niggardly spirit of parsimony, or from a craven feeling of helplessness, other Powers will soon look on the Empire, not with the regard due to an equal as she once was, but with jealousy of the height she once held and without the fear she once inspired. To build up an Empire extending over every sea, swaying many diverse races, and combing many forms of religion, requires courage and capacity. To allow such an Empire to fall to pieces is a task which may be performed by the poor in intellect and the pusillanimous in conduct."

The cost to the British Exchequer of the most valuable Colonies has been brought down to a nominal charge. There is no reluctance on the part of the wealthier Colonies to bear the cost of local defence. Sydney already possesses a turret-ship, the *Cerberus*. Melbourne has a small navy. At Adelaide an ironclad has been talked of. At Sydney a force of 300 regular artillerymen, a torpedo corps, and a naval brigade of 100 men has been organised. New Zealand possesses an efficient militia as a protection against the Maories. Tasmania has a corps of 800 volunteers, described to me by Lieutenant Bower of the *Wolverine* from whose correspondence these details have been derived, as badly organised, but full of zeal. Both Sydney and Melbourne have been partially fortified. It has lately been determined by each of the Governments of Victoria and New South Wales to expend £350,000, besides an additional annual outlay of £73,000, in providing a force of ships, guns, and torpedoes.

The resources of our Colonies are, indeed, ample for every purpose of self-defence. The fisheries of the Dominion of Canada, according to a statement of Mr. Frederick Young, give employment to 1,000 ships, 17,000 smacks manned by 7,000 sailors, and 26,000 fishermen. I am, however, informed by Sir Bryan Robinson, for twenty years Judge of the Supreme Court of Newfoundland, that these figures are inadequate. Speaking of the Colony with which he has been himself connected, he says th

the male population in 1874 numbered 82,693. Deducting, one-half for old men, young children, and a few persons who do not follow a sea-faring life, there would remain 41,347 sailors familiar with square-rigged vessels. The Dominion stands fifth in the maritime tonnage of nations, ranking after Great Britain, the United States, Norway, and Italty, but before Germany and France.

Turning from Canada to the Antipodes, their naval resources may be appreciated when we consider the immense seaboard of New Zealand, and the distance of a thousand miles which separates it from the Australian continent, and which must inevitably lead to a great development of maritime enterprise and power.

In a paper published in 1872 in the "Annual of the School of Naval Architecture," Mr. Barnaby rightly urged that the British Empire, if effectively organised as a maritime confederacy, would be enabled not only to maintain itself in security from attack, but that it would be a guarantee of maritime peace to all the wayfarers on the seas. Organisation, however, was then wanting, as it still is, and it is a work which essentially belongs to a time of peace. The initiative must come from the Mother-country—from our experienced statesmen and our numerous body of highly-trained officers, who have leisure for the consideration of these things.

The task before us is difficult, because it has been too long neglected. In a speech at the Crystal Palace in 1872, Lord Beaconsfield expressed his regret that the means and responsibilities by which the Colonies should be defended, and by which, if necessary, this country should call for aid from the Colonies themselves, had not been considered and defined at a time when self-government was conceded. I find an identical expression of opinion in the *Telegraph*, a Brisbane Journal, in an article on a pamphlet on "A Colonial Naval Volunteer Force," which I published in 1878. The question still demands solution. Sitting in the chair at a meeting of the Royal United Service Institution, during a discussion on Captain Colomb's paper "On the Naval and Marine Resources of the Colonies," I remember to have heard Mr. Strangways, late Premier of South Australia, declare that the first

and most important subject for consideration was that of Imperial unity. He asked whether, if they called upon the Colonies to join with England in a general advance of the whole Empire, they were prepared to give to those Colonies a voice in the question of peace or war. If England became involved in a great war, it would have one or two effects in connection with her relation to the Colonies. It would either bind England and her Colonies into one vast Empire such as the world had never seen, or it would entirely separate her from those Colonies. Which was the end that they should seek after? Was it not that of uniting together, into one vast whole, the enormous resources of the whole English Empire? Mr. Strangways recommended a Federal Council, which should be consulted on questions of external policy. Sir Julius Vogel, another ex-Colonial Minister, expresses the opinion that there is nothing impracticable in this proposal, because there is a complete identity of thought in the British people.

The Colonies are sensible of the weakness of isolated action. They know that each Colony is too jealous of the rest to admit a formidable combination under any other supremacy than that of the Mother-country. They know, to use the words of the leading Sydney Journal quoted by Mr. Baden Powell, that it would cost the Colonies no more to have their naval defence under Imperial than under local control, while they would get much more for their money in the shape of security. The proposal of Mr. Barnaby that each member of the British Confederation should contribute towards the national fleet in proportion to the volume of their exports, may be made the basis of an equitable arrangement. It may be that some more independent plan in the nature of a perpetual and friendly alliance may be adopted. Whatever may be the final settlement, the indefinite adjournment of this question, simply because it does not happen to be pressed forward by agitation out of doors, is most earnestly to be deprecated. Bitter, indeed, will be the reproaches heaped upon the statesmen or the party which should be held responsible for having, from mere neglect, brought about the disintegration of the Empire.

The apportionment of responsibility, as between England and her wealthiest and most populous Colonies, is the only difficulty

with which we have to grapple. With regard to the points to be defended and the methods of defence, there are no differences of opinion. Few words can be necessary in order to establish the importance of providing for the defence of our coaling stations or the lines of communication with our Australian Colonies and with India and China. Since the introduction of propulsion by steam of iron ships and iron armour, foreign naval stations are more than ever requisite for supplies of coal and for repairs, which can only be effected in port. A steam navy, and more especially an iron-clad navy, if deprived of its coaling stations, is practically helpless. The *Alexandra*, our flagship in the Mediterranean, at her maximum speed, does not carry coal enough for three days; at the slower speed of 13 knots, she burns 200 tons a-day. The limit of her range at full speed does not exceed the distance from Plymouth to Lisbon or, perhaps, Gibraltar.

The recent detention of transports at St. Vincent, at a time when the early arrival of reinforcements at the Cape was a matter of most momentous importance, is another illustration of the necessity that exists for a sufficient number of well-supplied and properly-defended coaling stations. The importance of securing the British coaling stations against attack is the more urgent because all our coaling stations in America, the Brazils, in North Atlantic, the Cape de Verds, Maderia, and Lisbon, and those in the Pacific, and Japan would no longer be accessible. Coal is contraband of war, and, as our cruisers would be unable to obtain supplies at the ports to which they usually resort in time of peace, the replenishment of coal would be one of the great difficulties with which the Navy would have to contend.

The bases on which the Navy would mainly depend in the event of war were enumerated by Sir William Jervoise in a paper read before the United Service Institution in 1871: "Malta and Gibraltar for the Mediterranean; Halifax and Bermuda for the Atlantic; Port Royal, Jamaica, from its position with reference to the West Indies and the Gulf of Mexico; Bombay and Aden, Simon's Bay at the Cape of Good Hope, Port Louis, Mauritius, a harbour in Ceylon, Singapore, Hong Kong, and some other ports are, in military language, the strategical bases for our foreign squadrons."

Vigorous efforts were lately made, under the apprehension of a war with Russia, to extemporise defences; but until a recent period Galle, Singapore, and Hong Kong on the line to India and China, and St. Helena, the Cape, and the Falkland Islands on the Australian route, were practically undefended. I have already stated that steps had been taken by the Colonial Legislatures to erect defences for Sydney and Melbourne; but I am not aware what progress has hitherto been made, and a letter lately received from a naval correspondent gives a somewhat humiliating picture of the state of affairs so recently as 1878. At that time, he writes, there was one never-failing topic that would excite and interest a Colonial community. It was necessary merely to mention the words "Russian privateer," and anywhere in the towns of Sydney, Melbourne, or Auckland the audience would start an animated discussion. Bank managers would explain that there was constantly a reserve of three millions in the Sydney banks, and in other towns a proportionate amount. Others would dilate on the useless expense of inadequate defensive works. A strong patriotic feeling existed; and, as a consequence, torpedo corps were extemporised, torpedoes ordered, guns mounted, and every preparation made for a passive defence; but, from first to last, in these English communities, amongst the most enterprising people in the world, nowhere, except in Melbourne, was a single preparation made for active offensive warfare. If we have been remiss in not providing for the defence of our Colonies and coaling stations, we have been equally supine on the scarcely less important question of dock accommodation. In the last session of Parliament, the First Lord of the Admiralty was perseveringly questioned by Colonel Arbuthnot, who succeeded in eliciting the admission that none of the Colonies have availed themselves of the Colonial Docks Loan Act of 1865, and that, in point of fact, except at Malta and at Hong Kong, and perhaps Australia, we have no dock accommodation for large ironclads away from England.

Returning to the unprotected condition of our foreign naval stations it may be asked: By what means is the defence to be secured? Not by the sea-going fleet. The main object of our naval policy, says Captain Colomb, should be to maintain our communications by

sea, by means of sea-going ships, which should be employed, not in the defence of the coaling stations which are their base of operations, but in cruising on the great sea route to and from the heart of the Empire, and in blockading the enemy in his own seaports. Fortification, as it has been said by Major Parnell, is merely a form of economy. It secures our ports, and allows our ships to be used more advantageously in offensive fighting. It is as a fence round a field. The farmer could keep off intruders by employing watchmen. A fence is the cheaper method. Fortifications need not be costly. Booms, torpedo boats, earthworks, a few guns judiciously placed, will protect a port from isolated cruisers. In America where, in the long struggle with the Southern States, naval operations for the attack and defence of harbours were carried out on a scale of unprecedented magnitude, it is considered that large ironclads are unnecessary, and that heavy guns, rams, and torpedoes are sufficient to make a good defence against a modern fleet. Where a military force is required to man works, the Colonial Governments will doubtless be prepared to raise a local militia, or to organise volunteers. Where a naval force is required to man a flotilla of rams or torpedo boats, it should be organised upon the model of the Royal Naval Artillery Volunteers, a corps which has been so successfully developed, both in London and Liverpool, and lately in Bristol.

A force like our Naval Reserve would also be required to man the crews of sea-going vessels. Mr. Marshall Smith, an experienced master in the Colonial merchant service, reports to the *Nautical Magazine* of May last that the crews of the merchant shipping of Australia number 5,300, of whom he anticipates that 2,000 would be ready to enrol in the Naval Reserve. If the Colonial seamen could be induced to join, the Mother-country could readily furnish the officers and instructors.

These are proposals which require forethought rather than money. In a harbour of great commercial importance such as Singapore or Hong Kong, a small charge upon the tonnage would provide the necessary funds. Where the trade is small, as in the Falkand Islands, the Home Government must pay just as it now does for Gibraltar and Malta.

For the harbour defence of India, the Indian Government has hitherto relied mainly on the torpedo. Two ironclads, the *Magdala* and the *Abyssinia*, have been provided, in addition, for the defence of the harbour of Bombay. Each of these ships cost £150,000. It has been urged in a professional journal of authority, the *Broad Arrow*, that with ten more such vessels we might effectually defend the Indian coast from the Indus to the Ganges.

Passing from harbour defence to the protection of our commerce on the high seas, I cannot express the opinion too strongly that it should be the policy of the British Government to make that commerce as far as possible self-defending. The rapid steamers owned by private shipowners, as both Mr. Burns and Mr. Donald Currie and other equally high authorities have pointed out, would supply an enormous additional power of offence as well as of defence. The Admiralty have issued circulars inviting the owners of ships, satisfying certain conditions as to bulkheads, to register their vessels on a list of reserve cruisers of the Navy; but no further action has been taken. In order to carry out this policy it would be necessary to offer inducements to shipowners, who contemplate the construction of ships of a suitable character in point of speed and other qualities, to communicate with the Admiralty at the time when the designs are being prepared. It would then be easy for the Constructor's Department to point out what special modifications were necessary in order to adapt such vessels for war service, and the expense of those special modifications should be defrayed by the Government. The terms upon which the vessels would be taken up by the Admiralty, when required in time of war, could not be determined beforehand, but would form a subject of an equitable arrangement when the emergency arose. This suggestion is one which, I fear, will never be adopted, unless it be forced upon the Admiralty by public opinion. Naval officers naturally desire to spend all the money voted for the naval services upon ships built specially for war.

I regret that I have occupied so large a share of your time with topics which may appear irrelevant in addressing a Chamber of Commerce. I plead the importance of the subjects I have brought before you, and the necessity of arousing the Government to action.

The annual value of the foreign commerce of this country, as shown by the Board of Trade Returns, exceeds 600 millions sterling. To this should be added for the shipping a sum which would bring the total amount at stake, in the event of war, to more than 650 millions sterling. Now, if it could be shown that, with an expenditure of less than a million, our coaling stations could be made secure, could any Government stand excused before the country, which would hesitate to apply to Parliament for the funds required for such a purpose? Under our popular system of Government nothing is done except in deference to external pressure. Agitation is too often the necessary preliminary to all administrative or legislative action. In appealing to the Chamber of Commerce of Bradford, I seek to make use of my present opportunity for a patriotic and a practical purpose. We are here to-day on a neutral platform in the centre of a great hive of industry. We acknowledge our dependence on our foreign commerce, and we think it our duty to arouse the Government to a sense of their responsibility for the security of our trade. We stand here to-day to discharge a still higher duty—to proclaim to our sons and our brethren, who have gone forth from our shores to settle in the distant dependencies of the Crown, that we admire and are thankful for the energy they have displayed in turning wildernesses into gardens, and in spreading their flocks and their herds over the prairies of North America and the boundless plains of the Antipodes. They are rapidly forming themselves into new nations; but we trust that they may long be content to live together with us beneath the mild and equal sway of our beloved and constitutional Sovereign. Let us send it forth as a message from Bradford that, so far as it depends on us, we claim no right of interference with their concerns, while, on the other hand, we are ever ready to obey their call for help. We think that the union of the Anglo-Saxon race is a mutual benefit to all the members of the family. Within a period of time so recent that it seems but the yesterday of history, we have seen the Italians and the Germans united under one Government. We recognise the accession of influence which these nationalities have gained. More lately still, we have felt the pressure of Sclavonic ambition. We have watched the progress of these events without apprehension

for ourselves, because we have had confidence in one another. Our communities may be scattered over all the earth. It is our pride and glory that they are; because, while we remain united by one deep national sentiment, and England is still a home to all her sons, there is not weakness, but strength, in the wide extent of our Colonial Empire.

WRECK INQUIRIES.

Paying the Piper.

A PREGNANT Parliamentary paper has just been circulated. It was moved for by Mr. Gourley last session, and shows the number and cost of official inquiries into wrecks and casualties held between the 29th September, 1876, that being the day on which the late Registrar of the Admiralty Court was elevated to the Judicial Bench as Wreck Commissioner, and the 31st December, 1878. It, for the first time, makes known to the world the exact cost of these inquiries in detail, and is, therefore, worthy of the most attentive consideration at the present moment.

The broad and striking fact discovered by this Return is that, in the little span of time it embraces (27 months) those inquiries have cost the British taxpayer the handsome sum of £47,478. Handsome as it is, it does not include the sums paid by that interested group of individuals included within the expression "the other parties," whose contribution will certainly not be less (if it is not more) in the aggregate than the contribution of the taxpayer; and when to that is further added a fair share of the Board of Trade vote, it is evident that the whole cost to both sides for the time covered by the return is not far off, if at all short of, £100,000, or, say, £3,703 14s. a month.

As, however, the Parliamentary paper under review contains only that part of the account with which the reader is interested in his capacity as a contributor to the taxes, we must confine ourselves to the item of £47,478 5s. 9d., and try to lay before him,

as far as the return enables us to do so, a statement of the value which the body of taxpayers received for its investment, which at 5 per cent. per annum would be equivalent to a capital of £949,565 15s.

Our readers will find as the total result of this outlay that in two years and three months 351 inquiries were held, and that they occupied the judicial, legal, assessorial, and other minds for 1,151 working (remunerative) days.

Of the above total inquiries the Wreck Commissioner himself held 85, and he sat 204 days, whilst the stipendiary magistrates and justices held 267 inquiries, and sat 947 days.

The 85 inquiries held by the Wreck Commissioner cost the taxpayer £18,185; and the 267 inquiries held by the stipendiaries and others cost him £29,293 4s. 8d.

The inquiries of the Wreck Commissioner occupied an average time of 2·4 days each; and the inquiries of the stipendiaries and justices 3·54 days each.

The cost to the taxpayer of the inquiries held by the Wreck Commissioner averaged £213 18s. 9d. each; and the cost of the inquiries held by the stipendiaries, &c., averaged £109 14s. 3d. each. The cost to the British taxpayer of each of the Wreck Commissioner's inquiries therefore averaged about double that of the cost of the other inquiries, whilst the time his inquiries occupied averaged one day less.

An important question for consideration is the utility of so many inquiries into collisions. We find, for instance, in the return now before us that the Wreck Commissioner's Court investigated 16 cases of collision at a cost of £4,000, and the magistrates investigated 20 cases of collision at a cost of £2,721 5s. 2d. In addition to these two sums must be put down the *Bywell Castle* and *Princess Alice* case, specially investigated at Poplar, which was, of course, altogether exceptional and necessary under the circumstances, and which cost £1,862 13s. 4d., and we get the respectable total of £8,583 18s. 6d. as the taxpayer's share. The costs of the other parties will certainly not be less than this, therefore we have at least £17,167 17s. "changing hands" for collision inquiry cases alone.

We have often ourselves pondered over these cases, and tried to evolve out of them some thing or some fact, or some series of facts, that might serve to make manifest some guiding principle or rule which the authorities may be supposed to obey in "ordering" them, and we have always arisen from our exhausting efforts with a sense of depression at their utter hopelessness. We give it up. No principle is discoverable. Take for instance the case of the *Avalanche* and *Forest* (£335 19s. of public money, and in addition a very great deal more of private money), at least £700 changed hands, and with what result? "Master of *Forest* severely reprimanded"—but this reprimand did not stand between the parties and the Admiralty Court, nor between the Admiralty Court and the appeal. All it did was to give a decision which set people by the ears while it effected no ultimate good of any sort whatever, unless indeed the "reprimand" administered to the master did *him* good, but if it did, was it worth £700? The same may be said of at least three-quarters of these inquiries into collision cases. No other Court is bound by them, nobody cares for them, and they are forgotten. There are notable exceptions as in the *Deerfoot* and *Angelo*, the *Princess Alice* and *Bywell Castle*, and the *Helvetia* and *Fanny* cases, but on the whole it appears to us as lookers-on that if that good part of the £17,167 17s. which has been "evaporated" in collision cases without any possibility of an adequate result, had been spent in a few prosecutions in cases where one ship runs away without giving her name, and leaves the crew of the other in danger, then the investment would have been commercially sounder, and the result for the money more satisfactory to the feelings of the British taxpayer.

But, let us resume an examination of the "returns." We find that the most notable of the cases heard, *i.e.*, cases that cost more than £255 each, other than collisions, investigated by the Wreck Commissioners, are* :—

* [The reader is requested to bear in mind that in this article we are reviewing a parliamentary return, which, while it shows the cash cost of these inquiries, in no way deals with their social, moral, instructive, and commercial value, or worth, to the community; and in no way hints at the great

NAME.	RESULT.	COST. £	s.	d.
Alexandra ...	Master reprimanded	377	15	6
Dakota	Master, 2nd, and 4th officers reprimanded ...	256	19	0
Sardinian ...	No blame to any one	457	10	10
Orion	No blame to any one	237	3	6
Ida	Officers exonerated	248	18	6
Rover	Engineer, 12 months	332	6	1
Sidonian	Dead engineer to blame	274	16	4
El Dorado ...	Master's certificate cancelled	274	0	10
Woodham ...	Officers exonerated	229	17	10
Cairo	No one blamed	302	8	5
Calenick	Vessel unseaworthy	299	12	4
Chillianwallah ...	Master in default	516	7	8

Cases of the same sort held by the magistrates and justices were :—

NAME.	RESULT.	COST. £	s.	d.
Agil	Master's certificate cancelled	280	17	0
City of Venice ...	Error of master	280	16	7
Britannia ...	No one to blame	265	14	9
Summerlee ...	Master somewhat to blame (dead)	250	9	2
Pioneer	No one to blame	293	13	1
Red Cross ...	Certificate suspended...	230	15	6
Bessemer	Certificate suspended...	268	19	0
Cybele	No blame	246	14	1
Consett	Certificate suspended...	248	1	9
Mary Ridley ...	Certificate cancelled	420	12	11
Emmaus ...	No result	273	13	5

The above cases are fair specimens of the whole list of cases, excepting that they are the most costly. To all of these must be added the cost of the "other parties;" and, in the case of those held before the Wreck Commissioner, the proper proportions of the salaries of the Wreck Commissioner and his officials. The above are facts of detail, which, if they are not useful, are certainly

---

good they have done. Take the cases of the *Sardinian* and of the *Sidonian*—in one case, "No blame to any one," and in the other case, "A dead engineer to blame." Those cases if judged by such mere bald statements as are contained in this return would throw discredit on the inquiries: but, really, in both cases facts and results of the utmost value were elicited and promulgated, and so on almost through the return. We wish our readers to understand that though from the return before us we set out the cases as here shown, the results of the inquiries in the cases named were often, for the good they effected, far and away beyond the value of the mere cash cost set against them.—ED.]

both curious and interesting. We trust that officers of the British Mercantile Marine will understand that besides having a social and moral and intellectual value, a reprimand is most costly, even if it be regarded in the light of its money value alone. One noticeable revelation made by this return is, that the old "disclassed" and maligned *wooden* ship does not figure so highly (proportionately) as does the (bran new) iron ship of the highest class. We believe that about 600,000 tons of new iron ships will be added to the totals on the classification books this year, and that 200,000 tons of wooden ships will lose their classification. Mr. Plimsoll would have the Board of Trade staff to survey these disclassed ships, so as to prevent them from going to sea unless put into a state of efficiency that would satisfy that Board. Of course, nothing of the sort will be listened to; but it will be an interesting proceeding to watch and record whether more of the individual ships included in the 600,000 tons of bran new iron structures, or of individual ships included under the 200,000 tons of old disclassed woodwork, will give the more employment to the wreck inquiry Court as "missing" or "foundered" ships. Our own view is, that some bran new ships are far more dangerous than some of the disclassed wooden ships, as the genus *Barley Barrel* is a development of the new species. Individuals of this class, like individual animals and plants in which attention is paid to the development of certain "points," degenerate into monstrosities. There is no greater monstrosity than the modern deep, water-ballasted, low-waisted, fully laden barley-barrel; and it is this monstrosity (a parallelopipedon, called by courtesy a steam "ship") that will need the closest and most suspicious attention.

The important consideration which this paper raises is whether the £50,000 spent by the British taxpayer, plus the £50,000 spent by the owners and masters, or, in all, £3,703 14s. a month, when spent in inquiry is spent in the best manner, that is to say, in the way that best secures the safety of Jack's precious life, while it interferes least with the consumer, the producer, and the carrier of food and other commodities of necessity and luxury. We think it is.

Mr. Plimsoll, and those who take his side of the question, will undoubtedly exclaim that £3,703 14s. a month (especially when

the shipowners pay half of it) spent on surveyors would do more good then if spent, as now, on lawyers. The impartial looker-on may regard the question as a very pretty struggle between technical men of two professions—men of the law pulling at one end of the rope, and men of surveying proclivities pulling at the other end; but he will fail to realise the principle involved.

We, on the other hand, who regard the matter from our own calm standpoint, and in the general interests of the maritime welfare of our country, can only come to the conclusion that if the State and the shipowners together are to spend £3,703 14s. a month for ever, it is best that they spend it as they do now, in a way that shall not harass trade and shall do the least possible harm; while now and then it lays bare a serious evil that might otherwise exist unchecked.

But apart altogether from the question whether the results of the batch of inquiries under review are worth £100,000 to the country at large (and even if they are worth nothing at all to it) we would complacently see that magnificent sum spent in the enrichment of lawyers rather than see it spent in putting the British shipowner and merchant into a strait waistcoat, thus crippling trade, and increasing the price to the consumer of everything conveyed under the British flag.

While, in passing, we cannot help recording the fact that the public at large would really like to see a shipowner or two made to suffer the penalty of the law for employing ships in trades and in a manner certain to result in the loss of life of the crew, together with an underwriter or two for insuring them and thereby abetting such unholy ventures, and perhaps an assessor or two for not having the sense or manliness to advise the "Court" properly as to the cause of the evil; we have far higher ground for desiring to see the £100,000 (so long as it is spent at all) go to fill the pockets of the lawyer rather than of the surveyor, and our higher ground is this, viz.:—These inquiries do an enormous amount of good, and the mere fear of them and of the agonising admonitions to be endured by masters and officers arising out of them does more good still. The elaborate and painstaking reports, though not always right on every point, disseminate us useful knowledge, and lay bare

facts and causes that must in the end command attention. They at any rate ought to touch cases which should be dealt with, while if the system of wholesale survey were to come in vogue, it would harass every shipowner, and would have to be accompanied by wholesale irresponsibility when once the surveyor shall have passed the ship. Such a system would, if adopted, lead directly to a fearful increase in loss of life amongst seamen.

There are no doubt many shipowners who would welcome indemnity and irresponsibility and the avoidance of injury even at the expense and annoyance of survey; and there are persons, regarded as "good" and "humane" beings, who would welcome the same; but the true philanthropist, the man who can see clearly and without passion, and who has no need to "coin his views for drachmas" of public notoriety, knows that for the good of the seaman as well as for the good of the producer and consumer, nothing of the sort should for a moment be tolerated. It might perhaps be well, some persons think, to give the seaman a remedy for injuries, and his relatives, or the State if he has no relatives, a claim for pecuniary compensation in the case of his death. This would be fair to Jack and might effectually solace his relatives, and might even compensate the State for his loss, but it would not add a jot to the safety of "our seamen." The cost would be paid by the underwriters for a very small addition (if any) to the present premiums of insurance.

Insurance, and the total irresponsibility of underwriters, who insure unseaworthy ventures, are at the bottom of the whole evil.

To sum up the whole case; a temporary difficulty has just now to be met, especially as regards a certain class of ships carrying grain and coal, but everyone who knows anything about it advises that there should be inquiry before anything is done by the Legislature,* lest a greater evil overtake us. Adapting Shakespeare's words, we may say:—

> "'Tis better to bear the ills we have,
> Than fly to others that we know not of."

[* Since the above was written, we observe, with much satisfaction, that at the instance of Lord Sandon a Select Committee is appointed to inquire into the subject referred to.—Ed.]

CRUISERS TO PROTECT COMMERCE.

(Communicated.)

WHEN we have been helped out of trouble by the skill of a friendly hand, it would be ungracious to severely criticise the method followed; but if it flashed on our mind that at no remote period a repetition of the dilemma was more than probable, it would be unwise to neglect the warning which experience had happily rendered.

In this particular instance the commercial marine of Great Britain and her Colonies stood on the verge of danger, the enemy was at the gate, when it occurred to the authorities to arm the magnificent steam fleets of Liverpool and Glasgow, and turn them into ships of war for the protection of trade. At this period it would have been unpatriotic to attempt to expose the weak points of these ships; but now the scare is over, the lesson it has inculcated should command the attention of all Englishmen. Economy must be lost sight of when the honour and commercial supremacy of the Empire are at stake; for wars occasionally come so unexpectedly that it becomes a positive necessity to have the material in hand for taking the initiative when the proclamation has been read.

It would serve no purpose to raise a question why the Navy was, on the eve of a war with Russia, so totally devoid of fast cruisers as to render the transformation of mail steamers into men-of-war an absolute necessity. The object is to avoid such occurrence in future. In former times, when the damage wrought by sailing ships had alone to be considered on 'Change, merchants felt that England, come what might, had not much to fear from the cruisers of an enemy, which could be blockaded in port or hunted down on the ocean. But it would now be idle to deny that steam had not in a very great measure neutralised our powers of offence and defence. So long as good seamanship was the most important factor, Englishmen had no rivals; now they have many whose steamers could effect great mischief at the outset of a war by the simple elements of speed, and a numerous crew.

A number of presumedly swift steel corvettes are now building or launched, but to judge by the recent trial trip of one at Plymouth the demon of combination has sacrificed swiftness to fighting powers. When their keels were laid, one of the leading mechanical journals alleged that they were to average twenty knots an hour in smooth water. Such a rate is quite attainable with a properly designed hull, but in this particular instance the assertion simply misled men whose lack of professional knowledge prevented their forming a correct opinion.

Constructors should remember that in future wars, the class which harries peaceful merchant ships will not seek the risks of actual combat; but will contentedly leave glory to another branch of their profession. Indeed, their aim, if they understood their mission properly, would be to avoid coming within gunshot of a national ship. By the adoption of such a policy the necessity of filling the decks with heavy guns, and the holds with their stores would be avoided; thus leaving space for coal, and the architect full powers as to form. It is worthy of remark that the Russians are keenly watching the performance of the *Hecla*; and there are good reasons for believing that, with certain modifications, the type is not ill chosen; although her talented builder little thought when he designed a peaceful merchant steamer, foreign nations would look on her as a typical man-of-war.

We need not speculate on the probable escape of the Russian cruisers from American ports if war had actually been declared. International obligations sit lightly on the shoulders of officials whose countrymen style them fools if they do not realize a competence from other sources than their incomes, and it is to be feared that during the hours of darkness an unpalatable supervision might have slept. There is something not altogether uncongenial to our feelings in lowering the supremacy of a great commercial rival, and dear experience has demonstrated that English vigilance slept during the War of Secession. The compensation demanded and paid for this default, although it touched our national susceptibility, need not be regretted if the lesson it inculcates tends to place English commerce beyond the reach of a war scare such as the nation laboured under a few months since.

The First Lord of the Admiralty recently stated in his place in the House of Commons that the original plans for converting merchant steamers into men-of-war were still adhered to, and that the authorities of the Controller's department were sanguine of success owing to the excellent protection guaranteed to the engines and boilers by the coal bunkers. The experiments made on the *Oberon*, from which Mr. Smith and his advisers drew their conclusions, were interesting, but of little practical value when the magnitude of the question at issue is considered. It will indeed be fortunate for the country, should events demand the trial, to find their anticipations realized; but there are grave reasons for believing that however much this class may be adapted to destroy merchantmen they are powerless to protect them.

Recent experience has demonstrated that an escape of high-pressure steam is more destructive to human life than boiling water, for while the dangerous powers of the latter are confined to its immediate neighbourhood, the other carries death to an unknown distance. The affecting narrative of the death of the commander, engineers, and firemen of the *Sidonian* furnishes a remarkable instance of this, without referring to the stupendous accident on board the *Thunderer*. It appears that they were not in some instances aware of the nature of the injuries they had sustained, three gained the deck without assistance, said they would be better by-and-bye, but in a few hours the whole were dead.

It is not the business of the engineer to investigate the causes which render steam so fatal; experience has demonstrated the fact in an unmistakeable manner and the danger cannot be overlooked in a naval engagement.

It is well known to all who are conversant with the Mercantile Marine that the boiler and high-pressure cylinders are invariably far above the water-line, the cover of the latter being generally on a level with the upper deck, and always above the main. Many carry a pressure of 70 lbs. to the square inch, and one now building is to have 90 lbs. In no instance are the cylinders of the best of these steamers protected by the coal bunkers; but are hedged in with iron bulkheads or open to the main-deck. To securely fence in such exposed machinery by coal, or iron plating,

would seriously affect a stability which is never excessive, although, owing to the great height of freeboard, ample for the purpose designed. In some, when light, a few bales of cotton rolled from side to side will often reverse a list of 10° or 12°. This crankness gives much trouble when discharging cargo, and up to the present none of the mail boats have been fitted with water-ballast, that useful adjunct being exclusively confined to cargo-carrying vessels.

The bunkers of ocean steamers are almost invariably built around three sides of the engines and boilers, and when full, form, up to a certain height, a reasonable protection from light guns; but if a shot penetrates below the water-line, the safety of the ship would be compromised, not only from the quantity of water which might enter through the injured plate, but by the additional risk of the spot being inaccessible. Again, this coal-armour must be consumed as the cruise proceeded, and often a few hours steaming leaves a vital portion of the machinery exposed. There is yet an important feature in connection with these vessels, which does not appear to have commanded the attention its importance deserves, and that is, the number of days it would take to remove a mass of deck-houses, strengthen the hull for its intended purpose, and equip the ship for sea. Quite recently the fitting out of one of these identical steamers for the conveyance of troops in a very great emergency required many days, notwithstanding an unlimited command of men and money being at hand, and the sympathies of all identified with their work. These grave defects should be carefully weighed in time of peace, in order that on future occasions ships properly constructed may take the place of the makeshifts proposed, which, with the simple exception of high speed and good bunker capacity, do not possess a single quality of an efficient man-of-war. But while this is admitted, they might easily be transformed into the most destructive harriers of commerce the world has ever seen, and, under the command of a modern Surcouf, leave a track of fire on the ocean, which our corvettes might follow, but fail to avenge.

In Tom Cringle's log, the American master is made to say "Your infarnal brass-bottomed sarpints turn up everywhere." If this was practicable in the days of sail, is it not discreditable to the

marine engineers of the greatest mechanical country in the world, that it is not so in the days of steam? Unless this is attained, England will, at the outbreak of a naval war, imperil the safety of her carrying trade; and experience has clearly demonstrated that when once diverted into another channel it is practically lost. It is therefore evident that new designs are indispensable, and equally certain, that guns and armour must, in a very high degree, give place to coal capacity and swiftness under steam. Unfortunately sail power cannot be dispensed with; but there is no necessity to pile up masts and yards as is now done. Steel or iron-tapered polacca masts without tops, no square canvas over a top-gallant sail, and fore-and-aft sails of the largest possible area, must form the rig of future cruisers. Regular broadside guns are almost useless for vessels whose object is to chase or flee; one or two on each broadside, with metal guides for transporting them across the deck on an emergency, and two pivot guns housed at a reasonable distance from the ends, would furnish an armament superior to any which a temporary makeshift could devise.

The most formidable enemy of the Mercantile Marine will be the swift, lightly-armed steamer, possessing speed which will enable her to defy the whole fleet of corvettes, whose names fill many pages of the Navy List. The now historical interview between Lord Beaconsfield and the English merchants from California, furnishes data, which cannot be gainsaid, of the opinion held by the latter on this subject. We had, said Mr. Harrison, "thirteen Russian cruisers lying in our harbour, and some six or seven hundred thousand tons of wheat about leaving it, and if it had been the policy of your Lordship's government to declare war in the interests of England, we must, for the time, have been ruined." Not only the merchants of California, but the whole of the sailing ships, and many of the low-powered steamers would have risked capture or destruction if Russian cruisers, purchased in American ports, had slipped through the doubtful leash of Customs' authority.

A distinguished Admiral once assumed that the *Shannon* was constructed for the purpose of hunting down the wasps who preyed on commerce. Up to the present time she has not

fulfilled the expectations claimed for her, and when experienced seamen look at her short ungainly hull, and ponderous foremast and bowsprit, the former too far forward, they feel assured that the predictions of the gallant officer cannot be realized. As a fighting ship, if fairly masted, she would prove a formidable opponent, but her enormous top-hamper is such a serious defect that it is marvellous it should have escaped the eye of so keen an observer. Unfortunately early prejudices and formed habits are often too deeply engrained in any class where emulation is not a necessity, and it is singular to note how officers who are still in the prime of life, and whose associations should make them embrace the ideas of the age, cling to the obsolete ideas of their fathers. In recent years senseless exercises against time have cost many a valuable life, and who amongst those who still uphold them can point to any real benefit derived from the sacrifice? By all means train seamen to exercise aloft, but this training to become effective should never be hurried, as the experience of officers who have watched a fleet reefing or shortening sail under exceptional circumstances can affirm. The supremacy of the ocean in future wars will not depend on smartness aloft, but on mechanical knowledge below, and seamen, in order to fully develope the powers of the splendid machines which have superseded the line of battle ships of former days, must cultivate it assiduously in lieu of closing the book of progress when the Rubicon has been passed.

In all that constitutes aptness for a sea life, the English have no superiors and probably few equals; courage, physical strength, and endurance seem to be inherent in the race, and so long as these great qualities were the sole elements required to command success, the Empire of the sea was undisputed. But since the sound of English guns has been heard on the ocean the genius of successive engineers has revolutionised alike ships and guns to such an extent that the identity of the former is almost lost, while the latter can only be manœuvred by the aid of no mean degree of mechanical skill. These changes have, in some measure, eliminated one of the factors of English supremacy at sea, as a critical examination of the navies of foreign powers will convince the most staunch admirer of his countrymen.

In an age which is essentially one of progress, and in none more so than in the devising of engines for destroying human life, these changes must be narrowly watched. Nelson broke the line at Trafalgar, avoided fouling, and after skilfully raking the ship of his adversary, rounded to under the lee, trusting to the valour of his officers and men for victory. A generation later similar tactics would have resulted in certain destruction, for the heavy shell guns of modern ninety-gun ships were not to be resisted by structures of wood. Fortunately, no great occasion arose to test the power of these beautiful models of naval architecture, and they are superseded by grim monsters of iron and steel fitted with a score of engines. The exigency of the times has demanded this innovation, and it has been adopted without hesitation; but while this was being wrought, the important branch which forms the subject of this paper stands, save the corvettes now building, as it did a quarter of a century since. Indeed it may be questioned if the *Tourmalines* and *Opals* of 1879 are superior to the *Pylades* and *Pearl* of 1855; neither are the *Condor* and *Flamingo* superior to the *Harrier* or the *Falcon*. The supremacy of England depends on many causes, and with a well-developed volunteer force in hand, ironclads are not so indispensable for defence as they were. But on the other hand her commercial marine requires protection on every sea to an extent that war alone will demonstrate. During the last few years two powers of the old world, Germany and Italy, have made extraordinary progress in naval architecture; so much indeed, that the weight of either thrown into the scales against this country will be a subject for grave apprehension. These contingencies should be carefully weighed by the statesmen who are responsible for the protection of the Empire, and a careful review of the subject will probably convince them that in the present dearth of effective cruisers to protect commerce, one important link in England's armour is at any moment likely to be pierced by an active enemy. To remedy so grave a defect economy must give way to safety. We cannot afford to risk a commercial Isandula.

HOW TO OVERCOME SOME OF THE DIFFICULTIES OF WEATHER PREDICTION.

THE paper in the February number of the *Nautical Magazine* on "The Difficulties of Weather Prediction" has attracted my attention, and struck me forcibly. Were not the contents so grave and sad, its perusal would have amused me somewhat, the writer laying his finger on sore wounds so gently that no pain is felt, pointing out the difficulties in such an amiable manner, and acknowledging, at the same time, that something has to be done to overcome them.

Allow me to offer a few remarks.

(1.) Page 91: "As to the very nature of the storms themselves we have much to learn. The doctrine may be thought heretical to propound, but we do not know accurately what is the real shape of any of these great systems of atmospherical disturbances."

I wish this doctrine were heretical, but it is not. Even after the storm has raged, we only know the real shape imperfectly, and we owe what we know especially to the charts of M. Hoffmeyer; but beforehand, or just when we want to know, our information is too scanty. In the Journal of the Scottish Meteorological Society, Vol. IV., p. 25, I urged that we should study the depressions, the craters, and make a mould of them; that we should inquire how the wind blows for such and such a gradient, and how the centre proceeds; how the centres of depression and of high pressure are disposed, and what is the distribution of air pressure between them.

In 1855 I proposed, and at the Paris Geographical Exhibition I exhibited, models of the distribution of pressure, wind, rain, temperature all over Europe for two consecutive days, more extensive than my weather charts, which I had given at the Dutch Association in 1852.

(2.) Page 91: "The overwhelming majority of our storms have no northern sides at all, and easterly winds are stronger than expected." This is attributable partly to the gradients being

calculated from the differences from 760 mm*, instead of from the normal heights at each place; partly to our not having stations far enough north. However this may be, it is certainly to be regretted; for now we are limited to those storms which belong to lower latitudes, and to those of which the centres pass over Spain or France, and which rarely occur. Did we know the whole area of a storm, then we could inquire if really, as the author supposes, the east winds are stronger than expected. On this point I differ from him. The easterly winds are indeed much feebler than the west winds for the same gradient, so that the rejected explanation given on page 90 seems to hold good.

On the other hand, I fully agree with the author that cyclones are seldom circular. My theory starts from supposing them at the origin, far from the centre, centripetal, then spiral; lastly, in the proximity of the centre of depression, circular or elliptical. I never advocated circular currents, but warned sailors against that supposition in 1852 in my preface to the translation of Sedgwick's "Law of Storms."

(3.) Page 91: "It is for the mathematicians to explain how such disturbances can be formed in the atmosphere." Of course it is, and we have to be thankful to MM. Mohn, Guldberg, Sprung, and others who are working at that grand task. We must try hypotheses simplifying the problem, and examine the observations in comparison with the results of those hypotheses, in order to modify them more or less. If we cannot obtain ampler information from the movements of the clouds about the proceedings in the higher strata of the atmosphere, and about the humidity, etc., we can only deduce general forms of movement, but we are not able to decide if Dr. Sprung be right in stating that at these, or other points of the orbit, the particles of air move inside or outside the curve of inertia. I did not dare to enter much into particulars in 1860, I then limited myself to inferring in a mathematical way

[* Note.—Professor Buys Ballot is slightly in error here, the gradients in use in the United Kingdom are calculated from the actual differences between the actual readings, not from "the differences from 760 mm."—Ed.]

only that the wind must veer around the centre of depression against the hands of a watch in our hemisphere, and with them in the southern; and that around the centre of high pressure the inverse must take place, but with only a small gyration, this commencing only at those points of high pressure.

(4) Page 92: "We are dependent for our information as to the actual weather which is prevailing about us, on reports from a number of stations distributed over the country; but we cannot afford, on the ground of cost, to receive information frequently enough."

On this point I must dwell somewhat more at length. I do not think it necessary to have information from as great a number of places as is generally supposed to form an opinion on the probabilities of great disturbances, though I acknowledge readily that to foretell smaller disasters, *e.g.*, the *Eurydice* squall, we ought to have had information from a great many stations near to one another. To explain and foreshadow local disturbances, reports from a great many places are wanting; to be warned against a great storm a few are sufficient if systematically chosen.

The Meteorological Council of England certainly cannot be accused of receiving information from too small a number of places, and wherever Directors of the Institutes in neighbouring countries exchange warnings, I think that a very few places would suffice. When I have information from eight places in France, eight in Germany, one or two messages from Denmark, a couple from the north of Scotland and the west of Ireland, I am quite content. The great difficulty is, I think, that we have no daily information from Iceland—(Mr. D. Milne Home, of Wedderburn, has strongly advocated the views which I proposed to the British Association at Edinburgh, 1871, in the Journal of the Scottish Meteorological Society)—and that there is no isle, or vessel, in the north Atlantic west from England. I advocated, many years ago, cables connecting us with Madeira and the Azores, some ships encircling England from the west side, and was very willing to agree with M. Hoffmeyer, that reports from Iceland especially would be desirable.

As long as we have not extended our line of sentinels, we must

try to have a greater number of reports daily. When we study the daily weather charts, it often happens that we are uncertain whether a depression has travelled eastward or if another fresh depression has originated there; we cannot follow the change of shape of depressions and areas of high pressure. Even an extra message in the afternoon, as is practised in many countries, cannot supply the want of continuous information. I feel strongly that want, and there is no remedy for this, but the telemeteorograph of M. van Rysselberghe, or that of M. Olland. The latter has already been established at Utrecht since 1877, and at the new Channel from Rotterdam to the sea. These instruments of Olland's give an observation every quarter of an hour, and write down the observations made at as many places as you please, one under the other, and where you like to have them.

By these instruments, the central observatory in each country might foresee the formation of a depression, the rise of the force of the wind, the change of moisture and temperature, and be able to inform all stations as soon as danger threatened.

In Holland four of them are quite sufficient; the same number, M. van Rysselberghe thinks, would be sufficient for England, and I suppose about eight for other countries. If these were established along the west coast of Europe, and we had besides information from the Azores, reports from a couple of places in the Atlantic, and from Iceland, we should be much better able than now to foresee storms. The telegraphic interchange between different countries could also be much simplified. I have no doubt that sooner or later it will come to continual reports being transmitted. A single observation may be of great interest, but the observer cannot decide whether it be of use or not; therefore, at certain places there should be an observer continually transmitting his observations. This may be effected by the telemeteorograph, and at the central station the officials would have a bird's-eye view of all greater changes approaching or occurring over the country.

It may be useful or not to know the gradients; if the former, we should know them continually, see their change in connection with the veering of the wind, the rise and fall of temperature and change of moisture. It is rather costly to have ten wires for

meteorological purposes, but the apparatus themselves are cheap enough, and their work is very simple. At the intermediate stations the usual information will be sufficient, and the gain for theory and practice will be immense.

I hope to have contributed my mite to bring this proposition into discussion, I wish I might add into execution.

BUYS BALLOT.

THE NEW NAVIGATION AND SUMNER'S METHOD.

(*Concluded from page* 116.)

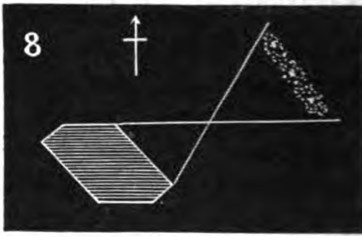
IT will always be judicious to check the direction of the line of position; this is a very easy operation by means of "time-azimuth tables."* Though the *circle* of position is everywhere perpendicular to the true bearing of the object observed, not so the *line* of position; it will be different at the two ends of the line. By entering the "tables" with each assumed latitude, the object's declination, and its corresponding hour-angle, you get the true bearing for each latitude; then, at each end of the line of position, project the line perpendicular to the proper bearing; the crossing point of the two perpendiculars will show whether or not the line of position is good.

We have said that he who watches his chronometers knows his Greenwich time within a few seconds, if not exactly; the errors of altitude must be estimated according to the object observed, the weather, and the horizon. Having, through two sights, established the area of certitude, the ship's position is known, and the navigator shapes his course with confidence.

---

* BURDWOOD & DAVIS', or LABROSSE'S Time-Azimuth Tables, which are equally useful in "Sumner's Method" and the "New Navigation" as in finding the error of the compass; we are much surprised that the time-azimuth, by inspection, has not long since been alternated at the Examinations with the alt-azimuth problem.

Fig. 8 indicates how to make use of this area in relation to a group of shoals, or of low islands as yet out of range of sight, and according to whether the wish is to pass on one side or the other. Drawing the lines of bearing, as shown in the figure, the *direction of danger* in relation to the ship is ascertained; in this case it lies between N. 30° E. and east. If intending to pass southward of the group,



since the ship may possibly be at the north end of the area of certitude, no course to eastward of E. by S. is a safe one: similarly, intending to pass northward of the group, since the ship may possibly be at the south-east extremity of the area of certitude, no course to eastward of N.N.E. is safe. The figure is not correct in the relation of area to distance, but the intelligent navigator will understand what it is desired to illustrate.

Is it judicious or safe to shape a course on the line of position? Certainly it is. Habit has taught a good observer to properly estimate the errors of altitude, and due allowance will be made on this score. Having confidence in the chronometers, and knowing the errors of the compass by having lately taken time-azimuths for the quadrant in which the courses may lie, then, should the line of position lead to the channel bound for, to a well-known point of land, to a light—or so near thereto that it shall be within visibility, what is there to fear? If, *en route*, you get a sounding, the position, though out of sight of land, is as well determined as by cross-bearings when coasting. The result of a sounding on or near the line of position, or the bearing of a distant inland object (while the coast is still invisible) is priceless. No doubt numerous methods of speedily verifying the ship's position, according to whether the course is parallel with, directly towards, or oblique to, the coast line, will at once suggest themselves to the intelligent man; but there must be no vacillation, or half-heartedness,—let a good look-out and the lead take the place of these.

To those who have not critically looked at the problem, it may

appear extravagant to say that a single altitude will be of assistance in determining whether the error on the point by dead reckoning is due to a current, or to an error of the compass, or log; but such is, nevertheless, the fact, and we regret we have not space at present to develope this.

Neither theory nor method is new; and the graphic construction has not been used to the development of all its excellence. It not only shows the limit of error, but enables us to combine terrestrial, with astronomical, observations. What do the old methods of navigation for us?—In every problem the *data* are taken to be correct; out of which comes either a correct parallel, or a correct meridian. But all the *data* are not accurate; therefore, where by the old method a doubtful latitude would give a false longitude, and a doubtful "time from noon" a false latitude, we get from the geometrical line of position everything that a single altitude could possibly give; the *true position* is on, or very close to, the line, and it may not be safe to neglect the only observation we have. By the old methods we pretend to determine a point, but it is most probably a very false one. But it must not be lost sight of that we cannot use Sumner's Method without a partial recourse to the old methods, for what they are worth. These days of rapid steaming require, however, something at once more ready and certain than of old.

It is useless to say—"the problem is somewhat tedious." What of that?—it is part of navigation; and navigation, no less than seamanship, is part of duty. It is worse than useless to say the "theory is false," and that "the method has attained a position it does not merit;" it has been our aim to show the contrary, and we shall consider we have done a great thing if, through our instrumentality, the problem comes into more general use than heretofore.

To him, however, who is uncertain about his chronometer, Sumner's Method is of no avail; but he can nevertheless advantageously make use of a problem more than a century old, and which was first propounded by Samuel Dunn. Assuming two latitudes differing about a degree or less, taking the latitude by dead reckoning as the basis of the assumption, then, two simul-

taneous altitudes, or two altitudes with an observed interval between them, will, by the usual method of finding time at place, give four hour angles,—two of which appertain to each assumed latitude. It remains to determine the result by simple proportion.—

As the difference of elapsed times due to the assumed latitudes,
: is to the difference of those latitudes,
: : so is the difference between the true elapsed time and either of the computed elapsed times,
: to the correction of one or other of the assumed latitudes, as the case requires.

This correction is independent of any error in the chronometer, but the assumed latitudes must be approximately near the truth. The parallel on which the ship is, having thus been ascertained, it remains, if nearing the land, to feel the way by the land, and keep a good look out.

We pass on to the "New Navigation" as it is often termed on the continent. The advantages of the method, in various forms, have been illustrated, and discussed, by many eminent professors and navigators,—by Yvon Villarceau, Magnac and Rouyaux, Marcq Saint Hilaire, Hilleret, Boitard, Mas Saint Guiral, Crévost, Caspari, Fasci, and Mouchez; and the tables of Labrosse, Perrin, and others, have been introduced almost solely to work out parts of the problems, by inspection. The partisans of the old methods are positively furious on the subject; while the propounders and promoters of the new methods have determined upon nothing less than a radical change in the theory and practice of navigation.

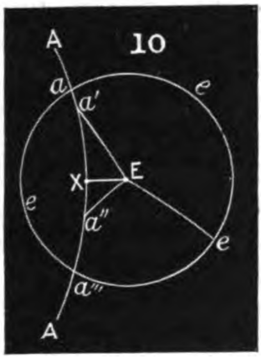
We explain one of these new methods.

Geometrical relation of the points X and E.—We may first observe that we have adopted X as the symbol for the *approximate* position of the ship, where the French use R; they call R the *point rapproché*, that is a point which *approaches nearer* to the true position of the ship than does the estimated point E.,—the latter being the latitude and longitude by dead reckoning.

Taking A to be the true altitude of a star derived from an observation made at a Greenwich time T, and at an estimated point E on the surface of the sphere, we can project the relative position of the points X and E as follows: and here be it remembered that

though the ship's true position lies in an unknown direction, and at an equally unknown distance from the estimated point E, we may generally assume a distance beyond which it is not probable that the ship could be,—and this without any serious result in computing the problem.

Let E, in Fig. 10, be the *estimated* position of the ship by dead reckoning; with E as the pole or centre, and the distance E *e* equal to the *greatest error* assumed to exist on the dead reckoning, describe the circle *e e' e''*; this is a *circle of error* within which lies the ship's *true* position. Now, project an arc of the circle of altitude (A A) such that it cuts the circle of error at *a* and *a'''*; if the altitude has been correctly observed the ship's position is *certainly* at some spot on that part of the arc contained *within* the circle of error; this is evidently the case, since the circle of error circumscribes all possible positions of the ship, and the ship must be on the circle of altitude. But the exact position is unknown, and there is no reason why it might not be at *a'* or *a''*; or at any other spot; preferentially the middle point X of the arc *a a'''* is taken, since it is the *mean* of all possible positions that the ship could have on the circle of altitude.



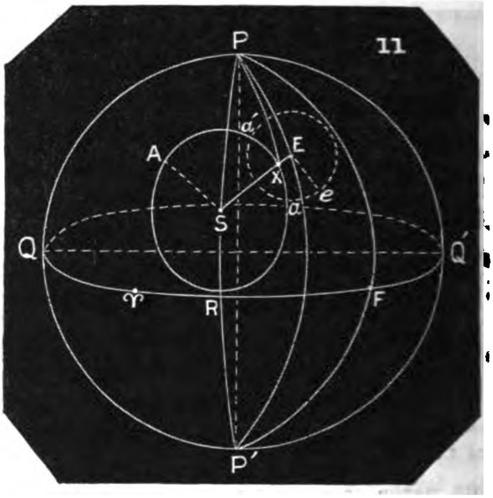
The point X is a very important one in the "New Method of Navigation;" it will be coincident with E when the estimated point happens to be the true point; under any other condition it must always be nearer to the true, than is the estimated, point; for, the arc E X is perpendicular to the arc (*a a'''*) of the circle of altitude since it joins E, the pole of the circle of error, to the middle point (X) of that arc; it is also evident that the distance of E from any point *a'* or *a''* on the arc of the circle of altitude is greater than the distance E X. Consequently, in solving the problem, if we take the point X as the *approximate position* of the ship, in preference to the position by dead reckoning, we are making use of a point approximately nearer to the true one.

We may now construct the figure on which the problem is based, and explain the numerous symbols involved in the formulæ—(Fig. 11). Let,

P Q P′ Q′ be the terrestrial sphere of which P and P′ are the poles, and Q R Q′ the equator;

E is the *estimated* point (lat. and long.) by dead reckoning, and *e a′ a* the circle of error;

S is the geographical position of the observed star, and A *a′ a* the circle of altitude projected by means of the zenith-distance S A (*i.e.*, 90°—alt.); then,



X is the *approximate* point (*point rapproché*) to be determined.

Join the points S and E to the point X by arcs of a great circle; E X is, as before shown in Fig. 10, perpendicular to the circle of altitude; S X is also perpendicular to the same circle; now, E X and S X, being both perpendicular to the circle of altitude at the point X, are consequently on the same arc of the great circle.

In the investigation of the problem; A and A″ = the two true alts. derived from the observed; A′ and A‴ = the two estimated alts. by computation;

L = true lat.; L′ = estimated lat. by dead reckoning;

M = true long.; M′ = estimated long. by dead reckoning; *d* L′ = diff. lat.; *d* M′ = diff. long.;

Z = estimated azimuth of A′; Z′ = estimated azimuth of A‴;

p = diff. between A and A′; *p′* = diff. between A″ and A‴.

Note on the time and hour-angle.—The Greenwich *time* of observation is such as is supposed to be shown by a good chro-

nometer whose error and rate are known,—date and time expressed astronomically. Ship time is not used, but the longitude by dead reckoning is. An object's *hour-angle* as a *westerly* meridian distance from Greenwich is obtained as follows:—

For a *star, planet,* or the *moon;*—To the M.T. at Green. add the mean sun's RA; this gives Green. sidereal time, from which subtract the object's RA; the result is the object's *westerly* hour-angle from Greenwich, and will be indicated by G.

For the *sun;*—To the M.T. at Green. apply the equation of time; the result is apparent time at Greenwich, and also the sun's *westerly* hour-angle from Greenwich; this will also be indicated by G.

Note this,—that *west,* whether for hour-angle, longitude, or azimuth, is positive or +; that *east* is *negative* or —.

Computation of the Approximate Point X.

For the *data* of the problem we have; an altitude A observed at a certain Greenwich date and hour T; we have also L′ and M′ the latitude and longitude by dead reckoning. The altitude may be carried, if required, to the horizon of a second estimated point E′; it would be necessary in the case of the sun.

With the hour T at the first meridian, compute, from the Naut. Alm., the sidereal time at the first meridian; also the right ascension RA and declination D, of the star, planet or moon. But for the sun we only require the equation of time and declination.

Reverting to Fig. 11, draw the meridians P E and P S; in the triangle P E S we know—

the co-latitude $PE = 90° - L'$, and

the polar distance $PS = 90° - D$

The object's hour-angle (G) for Greenwich has already been explained (p. 210); for the hour-angle at the place of observation, we have $SPE = G - M'$.

We can now compute E S and the angle P E S; we have, moreover, $EX = ES - XS = ES - (90° - A)$.

The arc E X is never so great but that it can be treated as a loxodromic curve.

Now, if the estimated, were the true, point, then the zenith distance already found by the observer would be E S; hence we

may call E S the *estimated zenith distance;* and for the same reason, the angle at E the *estimated azimuth;* we will put z for E S, and Z for the angle at E. To compute z, we do so by means of $90° - z = A'$, which we may call the *estimated altitude.*

As a matter of fact our computations are those of an altitude and a time-azimuth; the former comes through the latter, and this through an auxiliary arc ϕ, by the aid of three fundamental equations of spherical trigonometry—

$$(1) \quad \tan \phi = \cot D \cos (G - M')$$

$$(2) \quad \tan Z = \frac{\sin \phi \tan (G - M')}{\cos (L' + \phi)}$$

$$(3) \quad \tan A' = \cos Z \tan (L' + \phi)$$

The formulæ are absolutely general, and may be employed in all cases.

Obs. 1.—In the computation, $(G - M')$ is always to be taken less than 180°; when it exceeds that quantity, take it from 360°, and change the sign of the remainder.

Obs. 2.—The ambiguity of ϕ is of no moment; it is always taken between the limits $-90°$ and $+90°$.

Obs. 3.—The azimuth is reckoned from the elevated pole; also—

Obs. 4.—If $(G - M')$ is positive, the azimuth is also positive, and reckoned towards the west; if $(G - M')$ is negative, the azimuth is also negative, and reckoned towards the east.

Reverting to the expression $E X = E S - X S = E S - (90° - A)$; we now know from the computation that $E S = z = 90° - A'$; and as $X S = 90° - A$, we also know that $E X = A - A'$; by substituting p for E X, we have $p = A - A'$; and p will be positive when A is greater than A', otherwise, negative.

Thus much for the approximate point X.

It remains to compute A‴, Z′ and p', in respect to the other star, or the second observation of the sun, and to determine another approximate point X′; the method is similar, and can be understood from what has already been said.

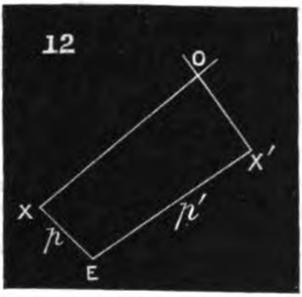
We will suppose it done, and we now have:—

$$p = A - A', \text{ with azimuth } Z; \text{ and}$$

$$p' = A'' - A''', \text{ with azimuth } Z'.$$

As before said, p is so small that it may be considered as a distance made in the direction of the azimuth Z, if p is positive; but in an opposite direction if p is negative. The same remarks apply to p' and azimuth Z′. It is very important to attend to these precepts, if we end the problem by a projection, as we easily can do.

Thus, Fig. 12, from the estimated point E set off p (in miles) in the direction of, or opposite to, the azimuth, as required; this determines the position of the approximate point X. In a similar way set off p' (in miles) to determine the second approximate point X′. From X and X′ erect perpendiculars; and the crossing point of the two perpendiculars fixes O, the place of observation, *i.e.*, the latitude and longitude of the ship, nearly.



This projection can, by the aid of a protractor, be made on the chart as readily as can Sumner's method. It is as well also to remark that though p and p' are arcs of great circles, the substitution of straight lines for curves produces but little effect on the result determined; in fact their length must extend to 63 miles in lat. 60°, and 280 miles in lat. 5° to cause an error of one mile in the approximate point X or X′.

Some of our readers may have noticed that we said the ship's position is determined, *nearly;* we said so advisedly, for there yet remain the errors of altitude, of the course and distance in the interval, of currents, &c., of which we have taken no account; these appertain to the "New Methods of Navigation," no less than to Sumner, and the old methods. But our continental neighbours are great in projection and nice calculations; they have what may be called "squared paper," that is, paper so ruled as to be covered with an immense number of very small squares; on a sheet of this paper having projected the point O, as in Fig. 12, they rectify it for every conceivable error, including also the chronometric curve for error and rate,—indeed they undertake to correct, by some of the new methods, the error and rate of the chronometer at sea.

But we may be permitted to doubt whether they really obtain a better result, or one of more practical value, than do some of our own able shipmasters,—we mean men who observe well, understand the methods of navigation and the errors to which they are liable, make all the necessary corrections so as to have as few imperfect data as possible, look carefully after the instruments—the compass no less than the sextant and chronometer, and who use Sumner's Method under the restrictions we have pointed out, viz., that it gives a zone or space, not a point.

Having shown the method of projecting the last part of the problem, it may not be amiss to indicate how the same result is to be obtained from p, p', Z and Z′, by the use of the Traverse Tables.

To find the diff. lat. (d L′) and thence the latitude (L);

we have, $d\ L' = \dfrac{p \sin Z' - p' \sin Z}{\sin (Z' - Z)}$;

and hence $L = L' + d\ L'$.

For the diff. long. (d M′), and thence the longitude (M);

we have, $d\ M' \times \cos L' = - \dfrac{p \cos Z' - p \cos Z}{\sin (Z' - Z)}$ = departure,

hence $d\ M'$ = dep. $\times \sec L'$; and $M = M' + d\ M'$

When using the Traverse Tables in connection with this part of the problem, strict attention must be given to the law of signs, as we have the + or − of p and p', as well as + for west and − for east. Hence the following table will serve for reference :—

Signs of Angles.	0° to 90°		90° to 180°		180° to 270°		270° to 360°	
	+	−	+	−	+	−	+	−
Sine ...	+	−	+	−	−	+	−	+
Cosine ...	+	+	−	−	−	−	+	+

It may appear to the reader that, in the "New Method," a single altitude is not available for the purpose of navigation as it is in Sumner's method; but such is not the case. As before said, p may be treated as a loxodromic curve. With p, and the azimuth (Z) appertaining to it, enter the Traverse Tables according to the following precepts :—

If p is *positive* take Z (or its supplement) as a course; but if p is *negative* take the course diametrically opposite to Z (or its supplement); look for p in the Dist. column; take out the corresponding D. Lat. and Dep., which may be used as the d L′, and d M′ × cos. L′, of the problem. Knowing these, d L′ applied by its sign to L′ gives a new latitude; also with L′ as a course and d M′ × cos. L′ (*i.e.*, Dep.) in D. Lat. column take out the D. Long. (d M′) in the Dist. column; d M′ is to be added algebraically to M′ for a new longitude. With the latitude and longitude just determined compute p anew; and then, repeating the above operation, find an approximate position of the ship which will be much less in error than that by dead reckoning. Instead of a line, as in Sumner, we get a circle whose radius will not exceed, at most, a third of the error supposed to exist in the position by dead reckoning, and it may possibly be correct, but this remains unknown, until the value of the second sight is determined. Of course it is understood that this computation is needless when the altitudes are simultaneous, which they cannot be with the sun as the object.

A written rule is always long; when you have mastered the theory, as given above, you will find the computation as short as that of Sumner's method.

Pagel's method is the usual "chronometer problem," determining at the same time the error on the hour-angle due to 1′ of latitude, and thus rectifying the position. As originally published it was defective for certain meridian distances, but he has amended this, and recently issued a "Cours de Navigation," with valuable tables for simplifying the computation.

For those of our readers who may not be aware of what has been published on the subject in England, we may state that Sir William Thomson has recently issued "Tables for facilitating Sumner's Method at Sea;" Captain W. S. Croudace has also published "Star Formulary for finding Latitude and Longitude by Sumner's Method;" Mr. Rosser issued an explanation of Sumner's Method as far back as 1851, and of Pagel's method in 1866, and we must not omit to mention that Mr. A. C. Johnson, R.N., has recently published several "Short Methods in Navigation"

bearing on this subject. There are also numerous small pamphlets, by various authors, on Sumner.

We cannot close this paper without reference to an article that not long ago appeared in a quarterly publication of some repute. The subject was "Modern Methods in Navigation and Nautical Astronomy," and we expected to find some valuable information on the "new methods;" but, as a matter of fact, and to our astonishment, everything was "as old as the hills;" and we were rather amused at the writer's idea of deeming it necessary to give his readers an investigation of a problem in spherical trigonometry illustrative of finding time at place. The method may have been new to him, but he must, like Rip Van Winkle, have been asleep for half a century or more.

We now give a problem, for this year, to be computed by "Sumner," as well as by the *new* method, last explained.

Ex.—1880, January 25th, shortly after 5 h. p.m. at ship, in lat. by D.R. 50° 40′ N., long. by D.R. 8° W.; when the M.T. at Greenwich by chronometer (corrected for error and rate) was 25 d. 5 h. 52 m. 0 s.; the true altitude of Aldebaran (α Tauri), deduced from the observed, was 41° 9′ east of the meridian; and the true altitude of Jupiter was 23° 42′ west of the meridian. Find the ship's position.

Compute the ship's position by "Sumner," using lat 50° and 51°.

Ans.—The position by "Sumner" should be lat. 50° 19′ N., long. 8° 56½′ W.; by the *new* method, 50° 20′ N.; 8° 57′ W.

Note.—We have purposely given a large error in the dead reckoning; also more than 2′ in the altitude of Aldebaran, and more than 1′ in that of Jupiter, in order that it may be seen how accurate is the result by the *new* method, which requires the D.R.

The altitudes in the question were computed for 50° 20′ N., and 9° W.

THE PROPOSED COMMITTEE ON ONE-SIDED FREE TRADE.

THE result of Mr. Wheelhouse's motion for a Select Committee "to consider the commercial relations at present existing between England and foreign nations, especially with regard to the import of manufactured goods from abroad, as well as the effect caused by our system of one-sided so-called free trade, with a view, if possible, of permanently ameliorating the position of the wage class of this country," can hardly fail to be satisfactory to the true friends of free trade. Only five members of the House of Commons could be found to support the honourable member of Leeds in his bold, though Quixotic, attempt to revolutionise our present commercial system by returning to the worn-out follies of the past. There is something truly lamentable in the mere fact that the representative of one of the most important manufacturing towns in the kingdom should be found giving expression to such transparent fallacies as those by which Mr. Wheelhouse endeavoured to bolster up his motion. That protective duties should be imposed for the purpose of enabling British artizans "to hold their own," and for the purpose of "alleviating distress," and that "what is called a glut in the market comes because English people are willing to buy articles of luxury which come from abroad," are propositions which might have been aired with credit when free trade principles were first broached; but they have long since become things of the past, so far as enlightened modern protectionists are concerned. It would probably be a sheer waste of time to endeavour to convince Mr. Wheelhouse and his followers of the unreasonableness of their views, but at the same time we would humbly venture to suggest that they should devote a little attention to some of the more plausible fallacies that have been advanced in favour of protection in comparatively recent times.

Our present purpose, however, is not to discuss the arguments that were advanced in support of the motion above referred to, but simply to draw attention to a statement contained in a letter

which Mr. Wheelhouse afterwards addressed to the *Times* and other leading journals as a kind of addendum to his speech before the House. In this letter, he states:—"My whole contention was that our imports of manufactured articles instead of being, as formerly, much less than our exports, having now become much larger, such imports unfairly infringed upon the wage-earning opportunities of our English artizan classes." In support of this astounding statement, a statistical table is given, the clearness of which, by the way, is exactly on a par with the ordinary stock arguments of Protectionists of the more backward school, but the general drift of which seems to be to prove that the balance of manufactured imports is now hopelessly against us.

For the purpose of enabling an estimate of the value of Mr. Wheelhouse's contention to be formed, we will simply quote the actual figures for the principal manufactured articles of import and export, for the year 1879. These figures are as follows:—

	Exports.	Imports.
Cotton Manufactures	£46,836,000	£2,288,000
Hardware and Cutlery	3,019,000	—
Iron and Steel (Manufactured) ...	15,585,000	1,722,000
Leather (Manufactured)	1,335,000	1,763,000
Linen ,, ...	5,474,000	—
Machinery	7,282,000	—
Silk Manufactures	1,695,000	12,841,000
Sugar (Refined)	971,000	4,162,000
Woollen Manufactures	15,850,000	5,708,000
	£98,047,000	£28,484,000

From these figures it must be evident to any man who is capable of using his understanding that there is a balance of manufactured exports in our favour to the value of something like £70,000,000. Of course it is hopeless to expect to convince a thorough-going Protectionist of the meaning of these simple figures, but at the same time it is perhaps desirable that such amazing "facts" as that for which Mr. Wheelhouse contends should not be left altogether uncontradicted.

BOOKS RECEIVED.

Report on the Meteorology of Kerguelen Island. By Rev. S. J. Perry, S.J., F.R.S. Published by Authority of the Meteorological Council. London: J. D. Potter and Edward Stanford.

This is the 37th official report issued from the Meteorological Office, and is exclusively devoted to Kerguelen Island, and the part of the ocean in which it is situated, giving the weather characteristics of the two extreme seasons—summer and winter. The "Island of Desolation," a name given to Kerguelen at an early date, appears to be a not inappropriate designation, for the aspect of the country is dreary in the extreme, not a tree or large shrub to be seen anywhere, and all that meets the eye being rock, lake, and bog. The shores are generally steep, rising in a succession of terraces and platforms, and the country alternately flat-topped basaltic elevations and sharp mountain peaks, while the coast-line is intersected by an endless variety of inlets, some of which stretch from eight to twelve miles inland.

Though trees and large shrubs are absent, small plants often cover a considerable extent of country; the well-known Kerguelen cabbage is abundant, but grass is rank and not plentiful. The imported rabbits have bred prolifically; and the characteristic birds of the region are very numerous, Kerguelen affording them good shelter and an excellent breeding ground. There is a good supply of excellent fresh water.

The thick fogs, high winds, and violent storms of the region in which the island is situated, are proverbial, so are the enormous waves; nevertheless, the land of Kerguelen, unlike the ocean that surrounds it, is not buried in perpetual mists, nor is its normal condition at any time one of severe and continual frost. The humidity is great, and the fall of rain and snow considerable; but weeks may pass without any excess in either. Summer differs less from winter than the latitude would lead us to suppose, and in no season of the year is the island safe from a sudden visitation of the most inclement weather. Snow rarely rests for any length of time on the lowlands before the month of June, and strong winds seldom last for more than twelve hours, except in the winter and

early spring. During the summer months, high winds most frequently begin from North or N.N.W., passing through N.W. to West; the storm is at its height when the wind is N.W., but the strongest blow may come towards the end of the storm. During winter W. by N. is the characteristic wind. The locality is still frequented by American whalers.

The report is a valuable contribution to the meteorology of the region.

Die Orkane, Cyklonen und Typhoone: nach den neuesten Forschungen für die praktischen Zwecke an Bord, bearbeitet von W. Döring, königlichen Navigationslehrer. Papenburg: Heinrich Rohr. 1880.

In a pamphlet of 36 pages, Mr. W. Döring has collected together the gist of the law of storms, not in relation to any new views on the subject, but entirely on the old basis,—that is, of the wind revolving in circles returning on themselves. As an explanation of the older theories it is ample and sufficient; we have all the old diagrams, and all the old methods reproduced in brief; most of the references are also to authors of the past generation. The views of Buys Ballot, Mohn, Hahn, &c., have no place in it, if we except a very short note on the 22nd page, in which we are told that the latest researches respecting the veering of the wind incline to a spiraltheory. As before said, from the *old* standpoint it is correct enough; but the word "*neuesten*" on the title page is out of place.

Der Befrachter, ein Berather in wichtigen Fragen für Schiffscapitaine, Rheder, und Kaufleute, von W. Döring: *Erganzungsheft I.* Papenburg: Heinrich Rohr. 1880.

It appears that Mr. W. Döring is also the compiler and editor of a standard German work, "Der Befrachter," or Freighter's Guide, intended for the use of shipmasters, brokers, and merchants. As a matter of course such subjects as average, bottomry, manifests, bills of lading, protests, &c., receive ample discussion; but a work of this kind ranges over a wide field, and requires amendment or additions from time to time, arising out of subjects of dispute, and as suits are decided in the law courts; besides these there are questions as to the depth of water in ports newly opened up, the

custom of ports, the interpretation of special clauses in a charter party, the meaning of certain terms—such as "moving days excepted," "a full cargo," &c.; these must be recorded for future reference. A freighter's guide is made up of an infinite variety of such details, valuable in proportion to the accuracy of the information. To keep up with the times, it follows that supplements are necessary, and the pamphlet before us is the first that has been issued to the second edition of "Der Befrachter."

Zeitschrift für wissenschaftliche Geographie, herausgegeben von J. I. Kettler. Heft I. Lahr (in Baden): Moritz Schauenburg.

This is the first number of a new periodical to be devoted to scientific geography, under the editorship of Mr. J. I. Kettler, and the names of the contributors associated with the editor are good. Its scope is a wide one,—embracing mathematical and physical geography, hydrography, climatology, meteorology, and the life of the globe; the theory of chart and map construction; the history of the progress of geography; the topography of the ancients, and of the middle ages; and the methods of geographical instruction and research;—altogether, much on the basis of Ritter's "Vergleichende Geographie" (Comparative Geography). If the programme is well carrried out, it will be a valuable work. The first number begins well, with a paper on Guanahani, and the first land seen by Columbus when he discovered the New World; it is illustrated with several charts, the originals of which were published in the 16th and 17th centuries. Besides other subjects and notices, there is also a good, though brief, paper on the method of estimating "the mean depth of the ocean" from observations already made.

A NEW PROBLEM.

To find the Latitude by two known fixed stars, whose altitudes are observed when they successively have the same bearing. N.B.—This bearing may be that of any vertical circle; but it is preferable when you wish to find the hour-angles, and thence the Longitude, to fix upon the *estimated* Prime Vertical. The Azimuth Compass will

be sufficient for this purpose if you do not select stars having too great an altitude. In the following example this is disregarded, because an instrument can be easily constructed to effect the purpose. And the illustration of the calculation is the same with high or low altitudes.

Example.

When on shore, Jan. 1st, 1875, I selected the two stars α Arietis and α Tauri. I found the corrected altitude of α Arietis to be 69° 19′ when bearing on the *estimated* Prime Vertical, due W. Afterwards I found the corrected altitude of α Tauri when it had the same bearing = 54° 53′. Required the Latitude.

Elements from the Nautical Almanac.

α Arietis: Declination = 22° 52′ N.; Right Ascension = $2^h\ 0^m\ 8^s$
α Tauri: Declination = 16° 15½′ N.; Right Ascension = $4^h\ 28^m\ 46^s$
Sidereal Time at mean noon at Greenwich = $18^h\ 42^m\ 55^s$

Solution.

	Decl., α Arietis	= 22° 52′	Sin 9·589489
	Alt., α Tauri	= 54° 53′	Cos 9·759852
Altitudes	$\left\{\begin{matrix} 69°\ 19' \\ 54°\ 53' \end{matrix}\right\}$ Diff	= 14° 26′	Cosec 0·603359
	m	= 41° 53′	Tan 9·952700
	,,	= ,,	Sec 0·031747
	Decl., α Tauri	= 16° 15½′	Sin 9·447109
	Alt., α Arietis	= 69° 19′	Cos 9·548024
	Diff. Alts., as above	. .	0·603359
	n	= 21° 38½′	Tan 9·598492
	,,	= ,,	Sec 0·128132
	$m - n$	= 20° 14½′	Sin 9·539052
	m,	as above.	Sec 0·031747
	Latitude	= 30°	Sin 9·698931

Having thus found the Latitude, the Error of the Compass may be easily found (by well-known methods) to be 15° W. And, as

the Greenwich mean times of Observations were found from a chronometer (whose original error and daily rate were known) to be, Jan. 1st, $7^h\ 42^m\ 52^s$ and $11^h\ 5^m\ 28^s$ respectively, the Longitude can be found from either altitude = 15° E.

The stars selected have too high altitudes for an Azimuth Compass, but the calculation is equally well illustrated with them, as it would have been with stars adapted to the Compass.

JAMES GORDON.

Morden College, Blackheath, S.E.,
February 7, 1880.

[Although we believe a Mr. Hay published a similar problem some years ago, we have given insertion to the above in consideration of Mr. Gordon's reputation in these matters. We desire, however, to remark that the problem is not a practical one, since there would always be great doubt about getting the second star *exactly* on the same vertical as the first.—Ed. *N. M.*]

CORRESPONDENCE.

OUR SEAMEN.

To the Editor of the "Nautical Magazine."

Sir,—In looking over a recent number of your valuable periodical, I notice some praiseworthy articles relative to the treatment of our sailors, and some seamen at home desire me to ask you now a few questions, by answering which they will feel much obliged, and instructed also.

1st. How comes it to pass that the scale of rations intended for seamen's use is not printed, and a copy of the same hung up in the forecastle of every ship sailing from the ports of Great Britain and Ireland, or, at least, those that come under the notice and jurisdiction of the Board of Trade, in London, Liverpool, and other places, and if the same be not enacted already, why not at once, and without delay, for justice's sake?

2nd. The Honourable Board of Trade have, to my knowledge, signified, with regard to copies of the same correspondence which has

from time to time, since last July, been submitted for their notice and consideration, that they would make no objection to outsiders printing them, but, on the contrary, sanction it. That being the case, Mr. Washington Dilley, we believe, will have no objection to show you such correspondence of sailors' grievances at home, and in the City of London, with a view to publication in your valuable and well-edited Magazine.

3rd. When boarding-masters take in sailors to board for the time the latter may be unfortunately detained in port against their will, can these boarding-masters at a moment's notice, when the whim or the notion takes them, throw the sailor out of their house and detain his bag and baggage, worth five times what is due for the miserable mouthful they may have eaten for a week or two? If so, is it by the authority of the Board of Trade, or has that Board any say in the preventing of such outrageous wrongs and abuses of sailors ashore in the Port of London; and if not, why not?

4th. When the Committee of the Board of Trade meet for the transaction of public business, are the proceedings carefully hidden from the reporters of the daily press; and should reporters be excluded from such meetings; and if not, why not?

5th. Should letters addressed to the Assistant-Secretary of the Board of Trade, bearing on the state and condition, the rights and the wrongs of our Jolly Tars at home, after the same have been read, and received, and duly honoured also by a returning answer, should they be allowed to see daylight in such a journal as yours; and if not, why not?

In conclusion we beg to say we are of the unanimous opinion, Mr. Editor, that if you feel inclined to notice this letter by answering the questions simply for knowledge sake, much good, no doubt, will arise.

I beg to remain, yours, &c.,

JOHN P. DALY, Assistant-Secretary,
"Sailors at Home" Meeting.

208, St. George's Street, E., Dec. 4, 1879.

[Our answer to the first question is:—The law requires that a readable copy of articles including the scale of provisions shall be accessible to the crew during the voyage—Section 166 of the

Merchant Shipping Act, 1854. Penalty, £5. If the law is not complied with in this respect, it is the fault of the seamen themselves who should proceed aft, and in a respectful manner, and without using a "big big D," remonstrate. If their remonstrance is not attended to, they should, on arrival in port, place the matter in the hands of an attorney, or report the case to the Board of Trade. The Board of Trade have nothing whatever to do with framing or approving the food scale. It is a matter of contract between the seaman and the master, or owner, and no seaman should sign the articles until he has examined the food scale for the voyage, and unless he has satisfied himself that it will give him the sort of food, and the quantity, that suits his constitution and tastes. In no trade is there a greater opportunity for the employed to insist on and obtain a real genuine food scale. It is a mistake quite unaccountable to suppose that there is any law which imposes salt beef and salt pork on seamen, any more than that there is a law fixing his wages. The matter of food is one of contract, just as open and free in every single case as is the rate of wages. The master has, under the law, a right to say he will not engage any seaman who will not live on salt cat, or salt horse, or salt pig; and every seaman has an equal right to determine that he will not engage to go on board a ship unless he has a properly-cooked dinner of fresh meat and pastry every day, with two sorts of vegetables, and butter and cheese to follow. In the one case, the ship would find a difficulty in getting a crew without the aid of a crimp; and, in the other case, the seaman might not get a ship unless she happened to be a mail steamer. Still, we have put the case as strongly as we can, to show to Jack how absolutely open the matter is, and that it is just his own fault and folly, and no one else's, if he signs articles for a poor or unsuitable food scale, or if he does not see that the law as to posting up the scale he has agreed to is complied with. Of course he also knows that if the food is bad and unfit, the owner is bound to pay him one shilling a day; and, if the quantity is short, from one farthing to eightpence a day. Our answer to the second question is: We have not the honor of the acquaintance of Mr. Washington Dilley, and we have no time

to go about to seek it; but if any correspondence is sent to us, we shall be glad to publish it, or its substance, if it is really valuable: but of this we must be the judge. Our answer to the third question is: The sailor is very much at the mercy of the boarding-master, and some boarding-masters are not endowed with high moral proclivities. We live in hopes, however, of some day seeing a law enacted whereby boarding-masters shall be put under police supervision, and their houses licensed. We would, in the meantime, call attention to the express penalty for over-charges, and for detaining seamen's effects, contained in Sections 235 and 236 of the Merchant Shipping Act, 1854. In answer to the fourth point, it has been held by Lord Coleridge that no act, deed, or direction of the Board of Trade is valid unless a quorum of the Board is present to authorise it by a formal minute. The Archbishop of Canterbury, the Bishop of London, and other dignitaries form the Board; and we have not heard that everything is not done in a most formal manner; nor have we heard that "His Grace, the Right Reverend Father, &c., &c.," has refused admission to reporters. A letter addressed to the Bishop of London, or to the Archbishop of Canterbury, would no doubt receive a courteous and full answer. As regards the fifth question, we must point out that we are not in a position to say what the Assistant-Secretary should or should not do with letters addressed to himself. As soon as we receive any appointment from H.M. Ministers, placing us in a position to pronounce on the subject, we will do so; but until we do receive such an appointment we must refer our correspondent to the Assistant-Secretary or to the Bishop of London.—Ed.]

THE WORKING OF HEAVY ORDNANCE.

To the Editor of the "Nautical Magazine."

Dear Sir,—Although it is very difficult to reconcile so many conflicting opinions on several vexed questions in reference to the ordnance of the future, yet everyone must agree that with the superiority of improved guns there must be greater necessity of better means of working them easily in small space rapidly.

The question of "end-on" and "broadside" fire receives its

best solution by a combination of both in an "all round" fire, which will satisfy both sides, and a similar advantage will be gained by a motion combining a direct and a flanking fire, from any port or broadside.

Evidently embrasures are the weak points, the most difficult to maintain, and most exposed to injury, and it therefore seems preferable to use barbette firing over uninjured parapets, with extended range; and from the upper decks of vessels an over-all fire over low bulwarks, or barbette turrets, or diagonal batteries, in echelon over the hatchways. In preference to elaborate portholes in high top-heavy bulwarks, that are only at best a weak defence, especially when two ports are knocked into one, as will happen even in the best-built vessels.

A double pivot movement has been brought out by which the movement is directed by two straight lines across two diameters of a curve, instead of round the circumference; and as these pivots revolve, and therefore can be turned and moved in any direction, they therefore take the most direct and shortest distance between any points. For traversing platforms it is now proposed to apply this motion to the movement of the ordinary standing guns by substituting four wheels (on a turn rail to form a revolving pivot) at each end of the gun-carriage in place of the two fixed truck wheels as at present, that only move in one direction, and that with difficulty, that require the cross lifting of a handspike. I shall be glad to give further explanations to anyone interested in the matter.

Yours very truly,

GEORGE FAWCUS.

3, Prior's Terrace, Tynemouth, Jan. 1st, 1880.

RULE OF THE ROAD.—INLAND WATERS, UNITED STATES.

To the Editor of the "Nautical Magazine."

SIR,—The accompanying paper shows that our American cousins are alive to the necessity for reform in the quarter indicated, and with their usual go-ahead spirit, are about to take "the bull by the

horns." Should you find room for it in the *Nautical Magazine*, I have no doubt it will prove interesting to the profession.

Sincerely yours,

SQUIRE T. S. LECKY,

Commanding (s.s.) *British Crown.*

Liverpool, 9 Feb., 1880.

" At a meeting of the Philadelphia Board of Trade, held on January 19, 1880, the Committee on Foreign and Coastwise Commerce presented to the Board, through its Chairman, Mr. Henry Winsor, a communication addressed to this Committee by Captain G. B. White, United States Navy, concerning the want of legislation by Congress as to the right of way for vessels navigating the inland waters of this country. Mr. Winsor spoke in commendation of the paper, and, upon motion, the Committee on Commerce was instructed to print it for circulation. The communication is as follows :—

" 'Philadelphia, January 5, 1880.

" 'Gentlemen,—The Honorable the Secretary of the Navy, in his Annual Report, has called the attention of Congress to the very defective condition of the laws of the United States in relation to the avoidance of collisions between vessels navigating the high seas and the inland waters of this country; and the " Steamboat Bill," in which legislation as to the right of way in inland waters has heretofore found a place, is now pending in Congress, with a fair prospect of some final action being taken this winter. In view of these facts, and of the great importance of the subject itself, the question of the right of way in narrow channels, in the inland waters of the United States, should receive careful and immediate consideration. As the law now stands, vessels under sail have the right of way to the exclusion of vessels under steam, or vessels under tow; and sailing vessels must give way to other sailing vessels, in obedience to fixed rules, in the framing of which, evidently, the relative draught of water of the passing vessels was not considered.

" 'The Government of the United States, at great expense, has made and deepened channels, or narrow natural channels exist,

leading to most of our large sea-ports. The middle of some of these channels has been marked with Range Lights.

"'These made or improved channels, it is evident, are intended and maintained for the use of vessels drawing so much water that the natural ones had not sufficient depth to float them.

"'The general rule that the steamer must avoid the sailing vessel, is a just and excellent one on the high seas, or where there is sufficient room to manœuvre the steamer, but, when the steamer or large sailing vessel is confined to a narrow channel, the question of relative draft of water of meeting vessels becomes a matter of the first importance in framing rules to avoid collision. It may be urged on the part of small sailing vessels that the steamer, having motive power, should stop or back, but those who argue in this way have little conception of the distance which a large steamer will go after her engines are reversed, or of the fact that when this is done her commander soon loses control of her.

"'Large sailing vessels in tow are more helpless than steamers. Outside of most of the narrow channels, especially those dredged or made, there is plenty of room, though with less depth of water, for all small vessels, but it is a fact that commanders of larger vessels, and pilots, have more dread of collisions in narrow channels with small vessels, than of any other danger; and it is the one great reason that this class of vessels will not run at night, causing great loss of time and money.

"'It would seem that the right of a small vessel, sail or steam, to obstruct the course and place in peril a large vessel—when by slight effort on the former's part, or probably without effort at all, it could be avoided—should not exist.

"'I think that all reasonable persons will agree to the justice of the general proposition :—"That in narrow channels vessels whose draught of water requires it for their safety, shall have the right of way to the exclusion of vessels whose safety does not require such right of way."

"'I think the following rules would cover the ground, and would be just, alike to the heavy and light draft vessels :—

"'*Rule First.*—When any vessel navigating the inland waters of the United States approaches a narrow channel, and her draft of

water is such that the right of way through such channel is necessary to her safety, she shall have such right of way to the exclusion of vessels whose safety does not require such right of way.

" '*Rule Second.*—A vessel so requiring the right of way shall indicate it, if a steamer, by displaying from her forward truck a red ball, at least five feet in diameter, between sunrise and sunset, and a red light above her masthead light from sunset until sunrise ; and if a vessel under sail, the ball as provided for in the case of a steamer from sunrise to sunset, and two red lights, one above the other, the lower one to be at least twenty feet above the deck and to be visible at least ten points on each side of her course, from sunset to sunrise. Sailing vessels will take in any sails that may obstruct the proper display of these signals.

" 'A vessel having in tow another vessel, and either of them requiring the right of way, as stated in Rule First, shall hoist a red light above the two vertical bright lights she is now required by law to carry.

" '*Rule Third.*—All vessels, sailing or steam, approaching a vessel displaying a signal as provided in Rule Second, shall use every effort, with due regard for their own safety to keep out of the course of such vessel, and in case of a vessel under steam, or being towed, to clear the middle of the channel.

" 'It will be observed that these rules contemplate giving the use of the channel to those vessels which really need it, to the exclusion of those who do not need it. This applies as well to steamers as to sail vessels.

" 'The light draught vessels are not required to give up any part of the channel that is necessary for their safety, but only to make it possible for the heavy draught vessels to pass over the courses necessary to their safety.

" 'Attention is invited to the quite common case of a large sailing vessel with a free wind drawing so much water that little deviation from her course, through a narrow channel, will place her in danger of meeting small vessels close-hauled bound in the opposite direction. Under the law the large vessels must keep clear of the smaller ones. To change her course to any material extent may cause disaster, to stand on it is to invite

collision. It would cause little inconvenience to the small vessel to make a short tack and clear the course of the large one. This would seem to be common sense, but the law not only makes it the right, but the duty of the small vessel to stand on her course. The Courts have decided that it is the duty of a vessel other than the one required to change her course to stand on up to the moment when a collision becomes inevitable, when she may act so as to reduce its force. Should she act differently she makes herself liable.

"'The proposed rules would assure the safety of the large vessel, and would give liberty of action to the smaller vessel to enable her to do what she would naturally desire to do under such circumstances.

"'These propositions are respectfully submitted to the Board of Trade of Philadelphia, in the hope that they will be carefully examined, discussed, and amended, so that they may receive the approval of all interested in the safe and speedy navigation of the inland waters of the United States, and when this is done, they may be pressed upon the attention of Congress until they are enacted into laws. The fact that something of this character is absolutely necessary in the interest of our rapidly-increasing commerce, it seems to me is evident to any one who will give a little thought to the subject, and for the reasons stated at the commencement of this communication. The time to act is now.

"'Very respectfully,

"'G. B. White,

"'Commander U. S. Navy.

"'Philadelphia, January 19, 1880.'"

APPARENT AND TRUE DIRECTION OF THE WIND WHEN SAILING.

[In reference to the letter received from "A Shipmaster" on the above subject, we shall, in our next number, deal with it in a special article, illustrated with diagrams.—Ed.]

TIDE TABLES FOR MARCH, 1880.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M. H. M.	London Bridge. P.M. H. M.	Hull. A.M. H. M.	Hull. P.M. H. M.	North Shields. A.M. H. M.	North Shields. P.M. H. M.	Leith. A.M. H. M.	Leith. P.M. H. M.	Devonport. A.M. H. M.	Devonport. P.M. H. M.	Dover. A.M. H. M.	Dover. P.M. H. M.	Weston-Super-Mare. A.M. H. M.	Weston-Super-Mare. P.M. H. M.
M	1	4 33	4 51	9 4	9 24	5 59	6 19	4 54	5 14	8 17	8 36	1 39	1 59	9 25	9 43
Tu	2	5 11	5 29	9 45	10 6	6 40	7 2	5 35	5 58	8 55	9 15	2 20	2 42	10 2	10 22
W	3	5 50	6 14	10 31	10 59	7 28	7 58	6 24	6 53	9 37	9 59	3 6	3 31	10 42	11 5
Th	4	6 40	7 8	11 32	—	8 31	9 8	7 25	8 1	10 25	10 57	3 58	4 27	11 32	—
F	5	7 42	8 22	0 10	0 52	9 50	10 36	8 42	9 30	11 34	—	5 0	5 38	0 6	0 48
S	6	9 11	10 2	1 36	2 20	11 24	—	10 18	11 4	0 18	1 7	6 22	7 10	1 39	2 31
S	7	10 48	11 32	3 4	3 44	0 10	0 51	11 44	—	1 55	2 40	7 54	8 32	3 18	3 58
M	8	—	0 9	4 20	4 49	1 23	1 49	0 18	0 41	3 19	3 52	9 3	9 28	4 34	5 5
Tu	9	0 41	1 6	5 13	5 35	2 12	2 34	1 7	1 29	4 20	4 45	9 53	10 16	5 33	5 58
W	10	1 27	1 51	5 56	6 17	2 55	3 13	1 50	2 10	5 9	5 30	10 38	10 59	6 20	6 41
Th	11	2 10	2 28	6 37	6 56	3 31	3 48	2 29	2 46	5 49	6 8	11 19	11 38	7 1	7 19
F	12	2 44	3 1	7 14	7 31	4 5	4 22	3 2	3 18	6 26	6 44	11 57	—	7 37	7 54
S	13	3 18	3 34	7 48	8 5	4 39	4 56	3 34	3 51	7 1	7 15	0 16	0 34	8 11	8 27
S	14	3 51	4 6	8 21	8 37	5 13	5 30	4 8	4 25	7 29	7 43	0 52	1 10	8 42	8 57
M	15	4 23	4 39	8 53	9 9	5 47	6 4	4 42	4 59	7 57	8 11	1 27	1 41	9 11	9 25
Tu	16	4 54	5 9	9 25	9 42	6 21	6 38	5 16	5 33	8 25	8 39	2 1	2 18	9 40	9 55
W	17	5 21	5 42	10 0	10 19	6 56	7 16	5 52	6 13	8 54	9 10	2 36	2 54	10 10	10 25
Th	18	6 1	6 23	10 41	11 8	7 39	8 6	6 36	7 1	9 27	9 47	3 14	3 36	10 42	11 4
F	19	6 45	7 12	11 39	—	8 36	9 11	7 31	8 6	10 14	10 45	3 59	4 26	11 33	—
S	20	7 46	8 26	0 15	0 53	9 53	10 37	8 45	9 30	11 21	—	4 58	5 36	0 8	0 50
S	21	9 9	9 59	1 34	2 15	11 20	—	10 15	10 55	0 4	0 50	6 18	7 0	1 36	2 22
M	22	10 43	11 20	2 56	3 31	0 1	0 37	11 30	—	1 34	2 15	7 39	8 14	3 2	3 39
Tu	23	11 53	—	4 2	4 30	1 8	1 33	0 1	0 27	2 53	3 26	8 43	9 6	4 12	4 39
W	24	0 20	0 43	4 54	5 18	1 53	2 12	0 47	1 6	3 53	4 16	9 27	9 48	5 5	5 28
Th	25	1 3	1 28	5 31	5 49	2 30	2 47	1 25	1 43	4 38	5 0	10 9	10 29	5 50	6 11
F	26	1 41	2 1	6 8	6 27	3 4	3 21	2 1	2 19	5 20	5 40	10 49	11 9	6 31	6 51
S	27	2 17	2 34	6 46	7 5	3 38	3 56	2 37	2 54	6 0	6 20	11 29	11 50	7 11	7 31
S	28	2 53	3 11	7 24	7 44	4 16	4 36	3 12	3 30	6 40	7 0	—	0 11	7 51	8 10
M	29	3 31	3 50	8 4	8 24	4 56	5 16	3 50	4 11	7 18	7 37	0 32	0 54	8 29	8 49
Tu	30	4 11	4 32	8 44	9 6	5 38	6 1	4 33	4 56	7 57	8 18	1 17	1 41	9 9	9 30
W	31	4 53	5 10	9 30	9 55	6 25	6 50	5 20	5 46	8 39	9 1	2 5	2 30	9 51	10 12

Week Day.	Month Day.	Liverpool. A.M. H. M.	Liverpool. P.M. H. M.	Greenock. A.M. H. M.	Greenock. P.M. H. M.	Queenstown A.M. H. M.	Queenstown P.M. H. M.	Kingstown. A.M. H. M.	Kingstown. P.M. H. M.	Londonderry. A.M. H. M.	Londonderry. P.M. H. M.	Brest. A.M. H. M.	Brest. P.M. H. M.
M	1	1 36	1 55	2 26	2 45	7 37	7 57	1 28	1 48	10 28	10 48	6 18	6 39
Tu	2	2 15	2 36	3 5	3 25	8 18	8 40	2 9	2 32	11 12	11 41	7 1	7 25
W	3	2 59	3 25	3 48	4 14	9 3	9 29	2 57	3 25	—	0 15	7 52	8 20
Th	4	3 53	4 26	4 42	5 12	9 58	10 33	3 56	4 31	0 54	1 38	8 52	9 29
F	5	5 6	5 54	5 48	6 31	11 16	—	5 11	5 54	2 26	3 13	10 13	11 5
S	6	6 48	7 38	7 21	8 9	0 6	0 55	6 40	7 25	3 58	4 38	11 57	—
S	7	8 22	8 55	8 52	9 29	1 40	2 20	8 5	8 41	5 12	5 39	0 42	1 18
M	8	9 23	9 46	9 59	10 26	2 53	3 19	9 11	9 38	6 3	6 26	1 46	2 11
Tu	9	10 8	10 29	10 50	11 13	3 43	4 [illegible]	10 3	10 24	6 49	7 11	2 34	2 55
W	10	10 49	11 8	11 35	11 55	4 29	4 49	10 42	11 0	7 32	7 52	3 15	3 34
Th	11	11 27	11 45	—	0 15	5 7	5 25	11 17	11 34	8 10	8 26	3 52	4 10
F	12	—	0 2	0 35	0 51	5 43	6 1	11 51	—	8 42	8 58	4 27	4 44
S	13	0 19	0 36	1 9	1 26	6 18	6 35	0 8	0 25	9 13	9 28	5 0	5 16
S	14	0 53	1 10	1 43	1 59	6 51	7 7	0 42	0 59	9 43	9 57	5 32	5 48
M	15	1 25	1 40	2 15	2 30	7 23	7 39	1 16	1 33	10 12	10 28	6 4	6 20
Tu	16	1 55	2 12	2 45	3 2	7 55	8 11	1 50	2 7	10 45	11 5	6 36	6 54
W	17	2 29	2 47	3 19	3 37	8 27	8 46	2 26	2 46	11 29	11 57	7 18	7 34
Th	18	3 7	3 30	3 56	4 18	9 8	9 31	3 8	3 32	—	0 29	7 57	8 22
F	19	3 56	4 29	4 43	5 13	9 59	10 33	4 1	4 35	1 5	1 46	8 52	9 29
S	20	5 9	5 56	5 49	6 32	11 16	—	5 13	5 55	2 30	3 14	10 14	11 1
S	21	6 45	7 28	7 16	7 58	0 2	0 4[illegible]	6 36	7 16	3 54	4 31	11 47	—
M	22	8 6	8 40	8 38	9 13	1 21	2 0	7 52	8 25	5 1	5 27	0 26	1 1
Tu	23	9 6	9 27	9 41	10 4	2 32	2 57	8 53	9 17	5 48	6 7	1 28	1 51
W	24	9 46	10 4	10 26	10 46	3 19	3 40	9 39	9 59	6 26	6 45	2 11	2 30
Th	25	10 22	10 40	11 6	11 26	4 0	4 19	10 17	10 34	7 4	7 23	2 48	3 6
F	26	10 58	11 17	11 46	—	4 38	4 57	10 51	11 7	7 42	8 0	3 24	3 42
S	27	11 36	11 55	0 5	0 24	5 16	5 36	11 24	11 43	8 17	8 34	4 0	4 19
S	28	—	0 15	0 44	1 4	5 56	6 16	—	0 8	8 52	9 11	4 39	4 59
M	29	0 35	0 55	1 24	1 45	6 37	6 58	0 24	0 45	9 30	9 49	5 19	5 39
Tu	30	1 16	1 38	2 6	2 28	7 20	7 42	1 7	1 30	10 10	10 33	6 1	6 24
W	31	2 0	2 23	2 50	3 18	8 5	8 28	1 54	2 20	10 59	11 28	6 48	7 19

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add*, − *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.	Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith	Jersey (St. Helier)	+2 38	Brest
Aberystwyth	−3 52	Liverpool	Kinsale	−0 18	Queenstown
Alderney	+2 59	Brest	Lerwick (Shetland)	−3 47	Leith
Antwerp	+5 13	Dover	Limerick	+1 15	Queenstown
Arbroath	−0 42	Leith	Lisbon bar	−1 17	Brest
Arcachon	+0 50	Brest	Littlehampton	+0 24	Dover
Arklow	−2 25	Kingstown	Llanelly bar	−0 38	Weston-s.-Mare
Ayr	−0 18	Greenock	Lowestoft	−4 1	London
Banff	−1 49	Leith	Lynn & Boston Deep	−0 29	Hull
Bantry harbour	−1 14	Queenstown	Margate	−2 18	London
Barnstaple bridge	−0 26	Weston-s.-Mare	Maryport	+0 3	Liverpool
Bayonne	−0 2	Brest	Milford Haven entr.	−0 58	Weston-s.-Mare
Beachy head & Rye bay	+0 8	Dover	Montrose	−0 52	Leith
Beaumaris	−0 51	Liverpool	Morlaix	+1 6	Brest
Belfast	+2 42	Londonderry	Needles point	−1 26	Dover
Berwick	−1 5	N. Shields	Newcastle	+0 23	N. Shields
Blyth	−0 8	N. Shields	Newhaven	+0 39	Dover
Bordeaux	+8 3	Brest	Newport	+0 16	Weston-s.-Mare
Boulogne	+0 13	Dover	Nieuport	+1 6	Dover
Bridport	+0 22	Devonport	Nore	−1 28	London
Bristol & King Road	+0 19	Weston-s.-Mare	Orfordness	−2 43	London
Cadiz	−2 2	Brest	Oporto	−1 17	Brest
Caernarvon	−1 56	Liverpool	Ostende	+1 13	Dover
Calais	+0 37	Dover	Padstow	−1 41	Weston-s.-Mare
Campbellton	−0 23	Greenock	Peel, Isle of Man	−0 15	Liverpool
Cardiff	+0 2	Weston-s.-Mare	Pembroke Dock	−0 42	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool	Penzance	−1 13	Devonport
Carlingford bar	−0 10	Kingstown	Peterhead	−1 43	Leith
Chatham	−0 47	London	Piel harbour, Barrow	−0 18	Liverpool
Cherbourg	+4 2	Brest	Plymouth breakwater	−0 6	Devonport
Coleraine	−1 37	Londonderry	Poole	−2 2	Dover
Coquet Road	−0 23	N. Shields	Port Carlisle	+0 47	Liverpool
Cordouan Tower	−0 10	Brest	Portland breakwater	+1 18	Devonport
Cowes (West)	−0 27	Dover	Port Patrick	−0 58	Greenock
Crinan	+4 41	Greenock	Portsmouth	+0 29	Dover
Cromarty	−2 21	Leith	Ramsgate	−2 19	London
Dartmouth	+0 38	Devonport	Rotterdam	+4 33	Dover
Deal & Downs	+0 3	Dover	Santander	−0 17	Brest
Dieppe	+7 19	Brest	Scarborough	+0 48	N. Shields
Donaghadee	+0 3	Kingstown	Selsea bill	+0 39	Dover
Donegal harbour	+0 17	Queenstown	Sheerness	−1 21	London
Douglas & Ramsay	−0 11	Liverpool	Shoreham	+0 22	Dover
Dublin bar	+0 2	Kingstown	Sligo bay	+0 17	Queenstown
Dundalk	−0 16	Kingstown	Southampton	−0 42	Dover
Dungeness	−0 27	Dover	Spurn point	−1 3	Hull
Dunkerque	+0 56	Dover	St. Ives	−2 10	Weston-s.-Mare
Exmouth	+0 38	Devonport	St. Malo	+2 18	Brest
Falmouth	−0 46	Devonport	St. Mary (Scilly)	−1 16	Devonport
Fecamp	+6 57	Brest	St. Nazaire	−0 7	Brest
Ferrol	−0 47	Brest	Stornoway	+6 38	Greenock
Flamborough head	−1 59	Hull	Stromness (Orkneys)	−5 17	Leith
Fleetwood	−0 12	Liverpool	Sunderland	−0 1	N. Shields
Folkestone	−0 5	Dover	Swansea bay	−0 53	Weston-s.-Mare
Fowey	−0 29	Devonport	Tay bar	−0 11	Leith
Flushing	+1 42	Dover	Tees bar	+0 22	N. Shields
Galway bay	−0 26	Queenstown	Tenby	−1 12	Weston-s.-Mare
Gibraltar	−1 27	Brest	Thurso	−5 49	Leith
Glasgow (Port)	+0 10	Greenock	Torbay	+0 17	Devonport
Gloucester	+2 51	Weston-s.-Mare	Tralee bay	−0 58	Queenstown
Granville	+2 26	Brest	Ushant (Ouessant)	−0 15	Brest
Gravesend	−0 48	London	Valentia harbour	−1 19	Queenstown
Grimsby (Great)	−0 53	Hull	Waterford	+0 19	Queenstown
Guernsey (St. Peter)	+2 50	Brest	Westport	−0 4	Queenstown
Hartlepool	+0 5	N. Shields	Wexford	+2 20	Queenstown
Harwich	−1 52	London	Whitby	+0 22	N. Shields
Havre	+6 4	Brest	Whitehaven	−0 9	Liverpool
Helgoland	+0 21	Dover	Wick	−2 55	Leith
Holyhead	−1 12	Liverpool	Wicklow	−0 41	Kingstown
Holy Island harbour	−0 58	N. Shields	Workington	−0 19	Liverpool
Honfleur	+5 42	Brest	Yarmouth road	−4 43	London
Inverness	−1 59	Leith	Youghall	+0 13	Queenstown

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London, W.C., and 6, Lord Street, Liverpool.

ENGLISH (APPLICATIONS).

272. Edmund W. Halliday, Bedminster, Somerset. "Improvements in steering apparatus."

352. William H. Daniels, London. "A new, or improved, screw-propeller."

408. Jonathan Russell, London. "An improved, combined, floating dock and lift." (A communication.)

426. Louis E. Chagrot, Mende (Lozère), France. "An improved system of screw-propeller and rudder, facilitating the evolutions of vessels and the fitting on board." (A communication.)

443. Joseph Fricot, Chateaugontieux, France. "Improvements in screw-helm."

456. James Whyte, Hackney, Middlesex. "Improvements in anchors."

495. Alfred M. Mayer, South Orange, Essex, New Jersey, U.S.A. "An improved method of, and topophone, or apparatus for, determining the direction, relatively to the place of observation, of a sound-producing instrumentality; applicable more especially to the navigation of a vessel in a fog." (A communication.)

509. William H. Mallory, Bridgeport, Connecticut, U.S.A. "Improvements in torpedo-boats, or fish torpedoes." (Complete specification.)

551. James Thomson, Leith, Edinburgh. "Improvements in means for securing grain-cargoes in steam and other vessels."

593. Morgan Rees, Mumbles, Glamorgan. "Improvements in, or relating to, paints or compositions applicable for covering the bottoms of ships, and other exposed structures or articles."

AMERICAN.

222990. Henry Flowers, Halifax, Nova Scotia, Canada. "Reefing and furling sails."

223035. George B. Berrell, Abrugton, Pa. "A life-boat."

223350. Ferdinand Imhorst, Baltimore, Md. "A machine for unloading vessels."

AUSTRIAN.

2727. W. B. Barker, Hoboken, New Jersey (U.S.) "A maritime safety signal."

BELGIAN.

50044. L. Gravier. "A ship-screw."

50127. A. Sommerville. "Insubmersive life-gloves."

50167. Z. Oram and P. B. Grove. "A ship-propeller."

CANADIAN.

10290. John L. Lay, Paris, France. "Improvements in torpedo boats."

10305. Sir James L. Foulis, Colinton, Scotland. "An apparatus for preventing the entrance of water into, and for ventilating boats."

10333. Benjamin J. C. Howe, Syracuse, N.Y., U.S. "Improvements in submerged pumps."

10425. John I. Thornycroft, Chiswick, England. "A screw-propeller"

10445. John W. D. MacDonald, Banbridge, Eng. "Improvements in folding boats."

10554. Richard Smith, Sherbrooke, Quebec. "A method of propelling vessels by steam."

10588. Joseph B. Hall, Chicago, Illinois, U.S.A. "Improvements in ships."

GERMAN.

8816. H. Schmidt and J. Bohberg, Flensburg. "An apparatus for cleaning ships' bottoms under water."

8856. R. Marcus. "Apparatus for cleaning ships' bottoms."

ITALIAN.

14. R. Gambaro and G. M. Molfino, Genoa. "An atmospheric and hydraulic propeller for vessels."

33. H. J. Cole, Wandsworth, London, England. "Improvements in apparatus for cleaning ships' bottoms when afloat."

BUOYS, &c., FOR SEA USE.

2504. June 23, 1879. James Clayton, Liverpool. (Not proceeded with.) Price 2d. This invention has for its object an arrangement

of a buoy that can be instantaneously detached, and be always seen at a distance when thrown into water; and which can be employed not merely to save life, but to save property also. It consists—1st. In a spring which, by pressure, can be immediately undone, and the buoy released from the bulwarks; 2nd. In a tubular buoy, preferably made of metal of an elongated contour formed of tubes and compartments, so that if one be accidentally pierced, the remainder will float. At one end is a safe for ships' papers, valuables, and the like, with a water-tight lid screwed down. To one end of the buoy is attached a weight by a clip or otherwise, capable of being easily detached. This weight causes the buoy to float in a perpendicular position, so that it can be seen from a distance; but it can be easily detached by anyone clinging to the buoy, if desired. A metal rail is fixed about an inch from the buoy on each side as a life-line.

PETROLEUM SHIPMENTS FROM THE UNITED STATES TO THE EAST.—Messrs. Vernon H. Brown and Co., of New York, have compiled a list of the exports of petroleum to places east of the Cape of Good Hope from the United States for the year 1879. The list shows that an increase has been made in this trade during the year 1879, and that the number of American bottoms employed was largely in excess of the foreign. This was also the case during the year 1878. In 1878, there were shipped for the East from the United States 3,745,120 cases petroleum, while, in 1879, 5,378,794 cases were forwarded, showing an increase during the last year of 1,633,674 cases. There was an increase in the amounts shipped to Bombay, Calcutta, Madras, Anjier, Java, Padang, Singapore, Rangoon, &c., but there was a decrease in the amount shipped to China and Japan. The number of vessels cleared during 1878 was 135, while in 1879 the number was 167. There was no shipment cleared by steam in 1878, but there were two shipments by steam in 1879; one to Japan and the other to China. This list of Messrs. Vernon H. Brown & Co., shows that the petroleum trade between the United States and the East is a prosperous and growing one.

LITTLE PROBLEMS FOR YOUNG OFFICERS.—No. III.

LET A and B be at anchor as before. The current as before, and no wind. This time C, the same ship as before, is lashed alongside of B, but her stern (C's stern) is pointing N., that is to say, her stern and not her stem is opposed to the 10-knot current. C, who is 300 feet long on the keel, has to go astern; and, casting off from B, has to try to make her way to A in one hour, turning astern all the time. We will suppose that C's screw is a right-handed screw, that is to say, right-handed when the ship is going ahead.

Now, from theory, answer the following questions:—

Will the screw, which is now pulling the vessel astern, have of itself any power in directing the course of the vessel?

Will the rudder have any, and, if any, little or much, power in directing the course of the vessel?

Will, or will not, the current keep the stern of C pointing N. or nearly N.?

Is it, or is it not, possible for C to get to A in an hour? If not, is it possible for C to get to A at all while turning astern? Give your reasons for your conclusions.

Give the result of any practical test you have made in any screw-steamer, which will enable you to judge whether, when going astern against a current, or tide, or stream, the stern, as a matter of fact, is, or is not, canted up against the eye of the current.

[*All answers should be addressed to the Problem Editor, "Nautical Magazine, 15, Great Queen Street, Lincoln's Inn Fields, W.C. Those who answer the whole Six correctly will receive a written testimonial or certificate. We trust that some of the older members of the profession will encourage the sending of answers to these problems.*—Ed.]

We have received some additional answers to Problems Nos. I. and II., which we shall acknowledge next month.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
84	Scotland—East Coast—Tay River—Dundee	Railway bridge lights.
85	„ „ Fraserburgh	Temporary alterations pending harbour improvements.
86	North Sea—Maas River	New fog-signals.
87	„ Elbe River	Alterations in light-vessels, &c.
88	Baltic Entrance—Kattegat—Liim Fiord—Egense Kloster	Alteration in light.
89	„ Sound—Copenhagen—Krone Channel	New leading lights.
90	Baltic—Prussia—Lubeck Bay—Dahme Head	New light.
91	„ Sweden — Kalmar-sund—Grimskär	Alteration in light.
92	„ „ Norrköping — Hvittskär	New leading light.
93	„ „ Norrköping Bight—Häfringe Islet	New light.
94	Norway—West Coast—Hest Islet	New light.
95	„ Lofoten Islands — Lofoten — Glopen	Alteration in light.
96	Mediterranean — France — Marseille — Cape Janet	New light.
97	„ Corsica—Macinaggio	New harbour light.
98	„ Bonifacio Strait	Sunken dangers.
99	„ Sardinia—N. and E. Coasts	Sunken dangers.
100	„ Adriatic — Venice — Port Malamocco—Rocchetta	Alteration of light.
101	Red Sea—Gulf of Suez—Suez Bay	Leading light exhibited.
102	Africa — West Coast — Liberia — Cape Palmas	Non-existence of reported dangers.
103	India—Ceylon—East Coast—Batticaloa	Light to be shown throughout the year,
104	„ East Coast—Madras	Time-signal.
105	Burmah—Martaban Gulf—Krishna Shoal	Range of light.
106	Sumatra—West Coast—Padang River—Apenberg	New harbour light.
107	China Sea—Singapore—Fort Canning	Alteration of light.
108	China — East Coast — Yangtse-kiang — Ariadne Rock	New automatic buoy.
109	„ Wusung River—*Lismore* Wreck	Alteration in light-vessel.
110	Russian Tartary—Peter the Great Bay—Port Vladivostok	New fog-signals.
111	Gulf of Tartary—Castries Bay—Klostercamp Point	New fog-signals.
112	„ Saghalin Island—West Coast—Dui	Additional fog-signal.
113	South Australia—Gulf of St. Vincent—Port Wakefield	Alteration of light.
114	Australia — East Coast — Cumberland Islands — Whitsunday Passage—Dent Island	New light.
115	„ N.E. Coast—Torres Strait—Prince of Wales Channel	New buoy on Sunk reef (d).
116	New Zealand—Middle Island—Foveaux Strait—Bluff Harbour	New light-vessel and jetty light.
117	United States—North Carolina—Albemarle Sound—Laurel Point	New light.
118	Nova Scotia—S.E. Coast—St. Mary River—Wedge Island	New light.
119	Newfoundland—East Coast—Bonavista Bay—Stinking Island	New light.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

84.—SCOTLAND.—*East Coast.—Tay River.—Dundee.—Railway Bridge Lights.*—Owing to the obstruction to navigation in Tay river, above Dundee, near the Tay railway bridge, the channel for passing the Tay railway bridge is now indicated by seven lights—the two outermost lights being *red*, the centre lights *white*. The *white* lights are shown from the centre of each span for the purpose of directing vessels to the deepest part of the channel, and to avoid passing near the piers. The headway under each white light at high water ordinary spring tides, averages 70 feet. Mariners are specially cautioned to steer directly under the *white* light. During the day, round signal boards, four feet in diameter, indicate the positions of the lamps on the bridge. Also, *two red* lights, placed vertically, are exhibited at the north end of the gap in the bridge, indicating proximity to the sunken girders.

85. — SCOTLAND. — *East Coast. — Fraserburgh. — Temporary Alterations.*—The harbour lights are now discontinued; and the north and south harbours closed to shipping, pending harbour improvements. During the period the harbours are closed, a temporary *fixed red* light will be exhibited on the eastern angle of the north pier head, immediately southward of the entrance channel to Balaclava harbour.

86.—NORTH SEA.—*Maas River.—Fog-Signals.*—The following fog-signals have been recently established:—

(1.) *At Hellevoetsluis.*—On the east mole head of the Commercial harbour, a bell, during thick or foggy weather, will be sounded when the prescribed fog-signals are heard from approaching vessels.

(2.) *At Horned Heads* or (Hoornshe Hoofden), on the north share of Haring Vliet, a bell, during thick or foggy weather, will be sounded when the prescribed fog-signals are heard from approaching vessels.

87.—NORTH SEA.—*Elbe River.—Light-Vessels I., II., and IV.—Alterations, &c.*—In consequence of the new light-vessel *Gustav*

Heinrich having been placed in the position of Elbe No. 1—the light-vessel *Caspar* (previously No. I.) has been moved to the station, Elbe No. II., taking the place of the light-vessel *Neptun*—the light-vessel *Neptun* has been moved to the station, Elbe No. IV., taking the place of the light-vessel *Ernst* (withdrawn and kept as a reserve light-vessel). The light-vessels are thus named as follows:—Elbe No I. is named *Gustav Heinrich* (otherwise unchanged); Elbe No. II. is named *Caspar*, and is moored in 10 fathoms water, the two lights are now elevated respectively 46 and 31 feet above the sea; Elbe No. IV. is named *Neptun*, and is moored in 10 fathoms, the light is now elevated 36 feet above the sea. Also note that Neuwerk lighthouse is a square massive tower roughly built; and that Brunsbüttel lighthouse is a square tower of a yellowish white colour, constructed of wood.

88.—Baltic Entrance. — *Kattegat.* — *Liim Fiord.* — *Egense Kloster Western Leading Light.*—*Alteration in Arc of Visibility.*—The light (*fixed white*) is now visible between the bearings N.N.E. through west and S.W. by S., instead of in the direction of the channel only, as previously. *Variation*, 13½° *W.*

89.—Baltic Entrance.—*The Sound.*—*Copenhagen.*—*Leading Lights for Krone Channel.*—They are *fixed red* lights, shown from round towers painted white.

The Low Light, elevated 24 feet above the sea, is shown from the central outer redoubt of the citadel (northward of the Langeline), fronting Castle bay. Position approximate, lat. 55° 41′ 40″ N., long. 12° 35′ 55″ E.

The High Light, elevated 40 feet above the sea, is shown from the rampart of the citadel, and bears S.W. ¼ W. from the low light, distant 148 yards.

Note.—These lights kept in line bearing S.W. ¼ W. lead through the entrance of Krone channel in a depth of 21 feet; passing about half a cable eastward of the broom beacon on the south-east port of Tubben bank, and the same distance westward of the beacon buoys marking the north-western edge of Revshalen bank. *Variation*, 11½° *W.*

90.—Baltic.—*Prussia.*—*Lubeck Bay.*—*Light near Dahme Head.*—From a lighthouse recently erected 175 yards within the

high shore near Dahme head (Dahmerhöft) western side of Lubeck bay. It is a *fixed and flashing* light, showing a flash *every five seconds*, elevated 108 feet above the sea, and visible through an arc of 252°, or between the bearings of S. 7½° W. and N. 79½° E.; the flashes should be seen from a distance of 14 miles; the fixed light 10 miles. The lighthouse, 94 feet high and octagonal in shape, is of a brownish colour; the keeper's dwelling attached is of a yellow colour. Position, lat. 54° 12′ 10″ N., long. 11° 5′ 40″ E. *Variation*, 12° *W.*

91.—Baltic.—*Sweden.—Kalmar Sund.—Alterations in Grimskär Light.*—The flashing white light previously shown between the bearings S. 31° W., and S. 35° W. is altered to a *flashing red* light. The fixed white light shown westward of the above-mentioned sector is altered so as to be visible only to the line of the east point of Svinö islet, westward of which it is obscured. *Variation*, 9¾° *W.*

92.—Baltic.—*Sweden.—Norrköping.—Leading Light on Hvittskär.*—Exhibited from a pole on Hvittskär, bearing N. by E. ½ E. from the east point of Grimö, in the fairway of the channel from Pampus bight to Norrköping; it is a *fixed red* light, visible from a distance of 2 miles. Position approximate, lat. 58° 37½′ N., long. 16° 12½′ E. *Variation*, 8½° *W.*

93.—Baltic.—*Sweden.—Norrköping Bight.—Light on Häfringe Islet.*—It is a *fixed white* light, visible from seaward between the bearings N. 28° E. and S. 37° W., and from a distance of 8 miles. Position, lat. 58° 36′ 0″ N., long. 17° 19′ 0″ E.

Note.—This light will be shown when the navigation of the channels surrounding Häfringe islet are not closed by ice. *Variation*, 8½° *W.*

94.—Norway.—*West Coast.—Light on Hest Islet* (*Hestsjær*).—From a lighthouse recently erected, the light is visible seaward between the bearings E. by N. and W. by S. ½ S., showing *fixed white* through the navigable channels, and either *flashing white* (short eclipses every alternate second), or *fixed red* over dangerous ground; elevated 75 feet above the sea, and visible from a distance of 15 miles. The sectors of light are shown as follows, viz.:—

1. *Fixed white* in the channel between Tromskarene and Bararmene, the limits leading about one cable clear of those shoals, also clear to the northward of the rocks extending from the shore, and southward of Hallaren shoal—Kvithholmen light is nearly in the centre of this sector. Vessels approaching from the westward, and seaward of Kvithholmen, should keep near the northern limit of this white sector, until past Langbaken shoal (about half a mile eastward of Kvithholmen).

2. *Flashing white* from one cable south of Baramene, to half a cable northward of Bjogna rocks.

3. *Fixed white* in the channel, northward of sector 2, to one cable's length southward of Mygrund and Midtfluen (the southern edge of Fuglevingerne with a depth of 5 fathoms on it). Approaching from the westward, when within the limits of this white sector, steer for the light on or about an E. ¼ N. course ; but with a heavy sea, keep near its northern limit in order to clear the foul ground of 8 or 9 fathoms water, off Hustad. Coming from the northward and nearing Fuglen, Kvithholmen light should be steered for till within this white sector of Hest light, when the course should be altered for that light.

4. *Fixed red* northward of sector 3, to 2 cables eastward of Grundkampen (where the depth is 8 fathoms).

5. *Fixed white* in the Ravngab (Ravneleden), north-eastward of sector 4, to one cable westward of Ravnene (Syd-Ravn). The mid-channel course through the Ravngab is S.E. ¾ S.; but, under ordinary circumstances, the light may be steered for when bearing S.E., as Grundkampen only breaks with a heavy sea.

6. *Flashing white* north-eastward of sector 5, to one cable eastward of Muen—a shoal which always breaks.

7. *Fixed white* in Kraakeleden, eastward of sector 6, to one cable westward of Kraaken rock. The mid-channel course through Kraakeleden is S. ½ W., but before entering this white sector, mariners must be sure of being southward of Griptarene (Nattergalene).

8. *Fixed red* south-eastward of sector 7, to three or four cables south-east of Fausken shoal, and the innermost rocks (Disken and Hilboen) of Indgrip (Indgripene).

9. *Fixed white* in the channel south-eastward of sector 8, to two cables northward of Hammersundsverne. To clear Solverboen, vessels must keep near the southern limit of this white sector. Stavnœs and Kvithholmen lights serve to guide clear of dangers at Engelen and Rödeggan.

Note.—As the channels indicated by the fixed white light (especially by sectors 1 and 3) are very narrow, mariners should bear in mind the character of the sector on each side of the channel they are navigating. Bjogna rock always breaks, and the noise may generally be heard at a warning distance. Bararmene usually breaks. Hallaren, situated nearly midway between Bjogna rock and Hest islet has 2 fathoms water over it. Northward of Hest islet a shelf extends to the distance of one cable, with a depth of 5 fathoms; vessels therefore should pass at a sufficient distance—avoiding also Braka (Braken) rock, lying W.N.W. distant 1 mile from Hest islet, and which always breaks. The light tower, square in shape with dwelling attached, is painted white. Position, lat. 63° 5′ 0″ N., long. 7° 30′ 0″ E. *Variation*, 17¼° *W.* Exhibited from 1st August to 15th May following.

95.— NORWAY.— *Lofoten Islands.— Lofoten.— Alteration in Glopen Light.*—South side of entrance to Sörvaagen :—The light (fixed white), is visible from seaward between the bearing E.N.E. and S.W. by S., except where obscured by the land between the bearings N.E. by E. and N.E. ⅓ N.; and visible from a distance of 16 miles. *Variation*, 14° *W.*

96.— MEDITERRANEAN.— *France.— Marseille.— Light on Cape Janet, and Withdrawal of Light-vessel.*—A lighthouse has recently been erected on Cape Janet, northern side of entrance to the new harbours of Marseille; it shows a *fixed white* light, varied by a *red* flash *every minute*, visible seaward between the bearings S. 45¼° E. and N. 53¾° E., elevated 151 feet above the sea, and visible from a distance of 15 miles. The lighthouse, 16 feet high and cylindrical in shape, is constructed of masonry. Position, lat. 43° 20′ 15″ N., long. 5° 20′ 50″ E. On the exhibition of Cape Janet light, *the light-vessel* now marking the northern entrance to the new harbours, *will be withdrawn;* and the westernmost light (fixed red)

of the traverse de la Pinède will be obscured seaward from a line drawn to Joliette lighthouse, to the bearing S. 21½° E.

Note.—Vessels approaching Marseille, and entering the new harbour from the northward, should make Cape Janet light, and steer for it until the lights (fixed red) of the traverse de la Pinède are seen, when the course should be altered so as to pass midway between those lights.

97.—MEDITERRANEAN.—*Corsica.*—*Harbour Light at Macinaggio.*—It is a *fixed red* light, shown from a post, close to a house on the east jetty; elevation, 26 feet above the sea, visible 5 miles.

98.—MEDITERRANEAN.—*Bonifacio Strait.*—*Sunken Dangers.*—Notice respecting sunken dangers hitherto uncharted, together with further information relative to shoals already placed on charts—the results of a recent survey:—

Cape Testa. North Testa Rock.—This shoal, 22 yards in diameter, with a least depth of 19½ feet on it, lies N. 82° W. from Cape Testa lighthouse distant $1\frac{3}{10}$ths mile nearly.

South Testa Rock.—This shoal, 33 yards in diameter, with a least depth of 24½ feet, lies S. 58° W. from Cape Testa lighthouse, distant 1¾ mile.

A *rock*, 16 yards in diameter, with a least depth of 9¾ feet, lies S. 58° W. from Sta. Reparata tower, distant half a mile. Two shoals of small extent, with the least depths of 26½ and 24½ feet, lie respectively S. 53° W. three-quarters of a mile, and S. 46° W. 9 cables from Sta. Reparata tower.

Longo Sardo Shoal.—This shoal, 16 yards in diameter, with a least depth of 11¼ feet, lies near the entrance to port Longo, and bears N. 53° E. from Longo Sardo tower, distant 3½ cables.

Colombo Shoal.—This shoal, with a least depth of 23 feet and of small extent, lies off Point Rosso, and bears S. 32° E. from Paganito rock, distant 4½ cables nearly.

Port Liscia.—A mud bank, with a least depth of 29½ feet, lies at the entrance to port Liscia, and bears S. 32° E. from the east point of Vacche peninsula distant 3 cables nearly. A bank, about 100 yards in extent, with a least depth of 19½ feet, lies within port Liscia, and bears S. 41° W. from the east point of Vacche peninsula distant 4½ cables.

Perduto Islet.—Three shoals of small extent lie with the following bearings and distances from Perduto islet:—One N. 9° W., distant 1½ cable nearly; another N. 32° W., distant 2 cables; and the third S. 58° W., distant 1¼ cable.

Carallo Shoal.—This rock, 33 feet in diameter, with a least depth of 22¼ feet, lies N. 58° E. from the north-east extreme of Lavezzi island distant 3½ cables nearly.

Lavezzi Shoal.—This bank, with a least depth of 33 feet and of small extent, lies S. 9° E. from Lavezzi rock distant 4¼ cables nearly.

Razzoli Shoal.—This cluster of rocks, with a least depth of 26¼ feet, lies in a north-westerly direction from the north-west coast of Razzoli island distant about 3¼ cables.

Barrettini Shoal (Sta. Maria Rock).—This rocky shoal with a least depth of 23 feet, lies in mid-channel of Sta. Maria pass.

Budello Rock.—This rock, of small extent, with a least depth of 23 feet, lies S. 80° W. from Marta islet distant nearly 6½ cables.

Washington Rock.—This rock, about half a cable in diameter with a least depth of 23 feet, is composed of granite, and lies N. 9° W. from point Ciaula (Spargi island), distant 5¼ cables nearly.

Spargi Island.—A shoal, of small extent, with a least depth over it of 18 feet, lies N. 15° W. from Spargi rock buoy, distant 6¼ cables nearly.

A shoal, 22 yards in diameter, with a least depth of 29½ feet, lies S. 82° E. from point Ciaula (Spargi island), distant $1\frac{3}{10}$th mile.

Spargiotto Islet.—A shoal, of small extent, with a least depth of 8¾ feet, lies S. 58° W. from the south point of Spargiotto islet distant 1¾ cable; and a similar shoal having the same depth over it, lies in a south-west direction from Spargiotelli rocks, distant about one cable.

Note.—Vessels should not navigate the channel between Spargi island and Spargiotto islet, as four shoals have been found in it. *Variation*, 13° *W.*

99.—MEDITERRANEAN.—*Sardinia.—North and East Coasts.—Sunken Dangers.*—Notice respecting the existence of sunken dangers hitherto uncharted, together with further information relative to Biscie shoal—the results of a survey recently made :—

Porco Shoal.—This rocky shoal, with a least depth on it of 29¼ feet, and of small extent, lies in the channel between Porco islet and Cala Salinas, and bears S. 54° E. from Cape Orso, distant 1¼ mile.

Pecora Shoal.—This rock, about three-quarters of a cable in diameter, with a least depth on it of 16¼ feet, lies N. 32° W. from the north-west point of Biscie island, distant nearly 5 cables.

Biscie Island.—A rocky patch, about half a cable in extent, with a least depth on it of 23 feet, lies N. 71° W. from the north-west point of Biscie island, distant about 3 cables.

Biscie Shoal extends farther eastward than shown on the charts; its length in an east and west direction being 3¼ cables.

Cape Ferro.—A small rocky shoal, with a least depth of 29¼ feet, lies S. 82° E. from the eastern extreme of Cape Ferro, distant about 1¾ cable.

Pori Shoal, with a least depth of 12½ feet, and of small extent, lies nearly in mid-channel between Mortorio islands and the coast of Sardinia, and bears S. 58° W. from the eastern point of Pori islet, distant about 6 cables.

Isle Volpe.—A rock, 14 yards in diameter, with a least depth on it of 14¾ feet, lies about one cable northward of the north point of Isle Volpe.

Note.—The coast between Mortale and Spada points is foul, and should not be approached nearer than 2 cables.

Sperlatto Shoal with a least depth of 3¼ feet, and of small extent, lies between Sperlatto point and Cape Ceraso—a short distance northward of the two rocks surrounded with sand, and distant about 6 cables from Sperlatto point.

Tavolara Shoal, about 30 yards in extent, with a least depth on it of 11¾ feet and 7 fathoms around, lies westward of Tavolara island, and bears N. 58° E. from the east point of Cavalli islet, distant 9¾ cables.

Port Taverna.—A granite rock, about 44 yards in diameter, with a least depth on it of 23 feet, lies on the eastern side of Port Taverna, and bears S. 58° W. from Mezzo islet, distant 4 cables.

Molarotto Islet.—Three shoals of small extent, lie seaward of Molarotto islet, with the following bearings and distances, viz.:—(1) With 3¼ feet water on it, bears N. 58° E. from the north-east point of the islet, distant about one cable; (2) with 19¼ feet on it, bears S. 54° E. from the north-east point of the islet, distant 175 yards; (3) with 11¼ feet on it, bears S. 58° W. from the rock off the south-east part of the islet, distance nearly 2 cables.

Cervi Islet.—Four shoals, of small extent, lie in the vicinity of Cervi islet, with the following bearings and distances, viz.:—(1) With 1¾ foot water on it, bears N. 9° W. from the islet, distant 1½ cable; (2) with 16¼ feet water on it, lies N. 32° W., distant 3¼ cables; (3) with 5 feet water on it, lies N. 82° W., distant 1½ cable; (4) with 5¼ fathoms water on it, lies S. 3° W., distant 2¼ cables. *Variation*, 13° *W.*

100.—MEDITERRANEAN.—*Adriatic.—Venice.—Port Malamocco.—Alterations in Rocchetta Light.*—The fixed white light previously shown is discontinued; and in place thereof a *flashing white* light is exhibited, showing a flash *every thirty seconds*, elevated 81 feet above high water, and visible from a distance of 16 miles. This light is shown, 44 feet north-eastward of its former position, from an isolated tower, constructed of brick. *Variation*, 14½° *W.*

101.—RED SEA.—*Gulf of Suez.—Suez Bay.—Exhibition of Leading Light.*—The light on the north shore of Suez bay advertised to be shown on 1st January, 1880, as a leading light through the deep water channel westward of Newport rock, and the channel near the Spit buoy, thence to the anchorage in about 5 fathoms water, is now exhibited. Further particulars will be given next month.

102.—AFRICA.—*West Coast.—Liberia.—Non-existence of reported dangers near Cape Palmas.*—With reference to the reported existence of a sunken rock in the neighbourhood of Cape Palmas, on which the British and African Steam Navigation Company's ship *Volta* is said to have struck—also, of shoal ground

(4¾ fathoms) reported by the steamship *Congo* in 1875,—Lieutenant Hughes-Hallett, commanding H.M.S. *Firefly*, gives the result of an exhaustive survey of the locality made with the boats of that vessel, which extended over a fortnight:—The *Firefly* was at first anchored near the reported position of Congo rock, afterwards near that of Volta rock—from these positions close lines of soundings were taken by boats in all directions, but without finding the reported rocks, or any material difference from the depth shown on the Admiralty chart. Having failed in finding the reported rocks or any trace of sunken dangers, by sounding—recourse was had to sweeping for them by a weighted line between two boats, but with a similar result. From this examination, and information obtained on the spot, it is considered that the dangers above-mentioned do not exist in or near the positions assigned them, and that the shoal ground reported was probably in the neighbourhood of Yoruba rock.

Note.—Yoruba rock, on which the steam-vessel *Yoruba* struck in 1873, is, by the *Firefly's* examination, situated W.N.W. from cape Palmas lighthouse, distant 4½ cables, or close to the position originally given for it on the chart. The wreck of the steam-vessel *Yoruba* (on the beach) bears N. 1½° E. from Cape Palmas lighthouse, distant 7 cables. *Variation*, 20° *W.*

103.—India.—*Ceylon.—East Coast.—Batticaloa Light.*—From a flagstaff near Batticaloa river entrance, and the light (fixed white) will henceforth be exhibited throughout the year.

104.—India.—*East Coast.—Madras.—Time Signal.*—The Semaphore on the Marine office flagstaff at Madras, will be dropped twice daily at the following times, viz.:—At 8 a.m. and 2 p.m., mean time at Madras. The Semaphore is extended at a right-angle five minutes before the appointed time—should the Semaphore not fall at the correct time, immediate intimation will be furnished to the shipping either by circular or by signal.

105.—Burmah.—*Martaban Gulf.—Krishna Shoal Light.—Range of Visibility.*—Since the small vessel *Colombo* has replaced the *Star*, as light-vessel off Krishna shoal, the light, now elevated 30 feet above the sea, is reported as being visible from a distance of barely 8 miles. A *blue* light every half-hour and a *maroon* at

the intermediate quarter hours, will continue to be exhibited from the light-vessel as heretofore.

106.—SUMATRA.—*West Coast.—Padang River Entrance.—Light near Apenberg.*—A new harbour light on the north-west side of Apenberg, south side of entrance to Padang river. It is a *fixed white* light, visible between the bearings E. by N. and S.W., from a distance of 6 miles. Position approximate, lat. 0° 57′ 55″ S., long. 100° 20′ 10″ E. *Variation*, 1¼° *E.*

107.—CHINA SEA.—*Singapore.—Alterations in Fort Canning Light.*—This light (fixed white) is now shown from a new flagstaff situated 20 yards southward of the old staff. It is visible through an arc of nearly 68°, between the bearings N.N.W. ½ W. and W. ½ S., or from one mile eastward of Peak island to one mile southward of Johore shoal; it is elevated 256 feet above the sea, and is visible from a distance of 20 miles. *Variation*, 1½° *E.*

108.—CHINA.—*East Coast.—Yangtse-Kiang River Entrance.—Automatic Buoy at Ariadne Rock.*—Moored half a cable southward of Ariadne rock, entrance to Yangtse-Kiang river. The buoy is painted red and black chequered.

109.—CHINA.—*Wusung River Entrance.—"Lismore" Wreck Light-Vessel.*—The brig *Condor* having sunk at the entrance to Wusung river (where "Lismore" wreck light-vessel was formerly moored), a *white* light will be shown from the wreck of the brig, when the weather allows. The light-vessel has consequently been remoored one hundred yards eastward of the wreck (*Condor*), or about 9 cables N.E. ½ N. from fort B; and exhibits, as formerly, two lights placed vertically:—The upper light is a *fixed red* light; the lower is a *fixed white* light. *Variation*, 2¼° *W.*

110.—RUSSIAN TARTARY.—*Peter the Great Bay.—Port Vladivostok.*—(1.) *Fog-Signals on Skrypleff Island.*—At east entrance of Eastern Bosporus strait. A bell, placed near the lighthouse at the south end of Skrypleff island, will be sounded during thick weather, fogs or snowstorms. Also, a gun, near the east point of Skrypleff island, will be fired in answer to reports of guns heard from seaward, during thick weather, fogs or snowstorms.

(2.) *Lights and Fog-Signals on Cape Goldobin.*—Eastern entrance point of port Vladivostok. Two *fixed white* lights, placed vertically.

Position approximate, lat. 43° 5′ 10″ N., long. 131° 53′ 20″ E. A fog-signal has also been established on the cape; it is a bell, which will be sounded during thick weather, fogs or snowstorms.

111.—GULF OF TARTARY.—*Castries Bay.*—*Fog-Signals on Klostercamp Point.*—Near Klostercamp (Quoin) point lighthouse, southern entrance point to Castries bay; the signals are a fog-bell, and a gun—the gun will only be fired when the report of a gun is heard from seaward.

112.—GULF OF TARTARY.—*Saghalin Island.*—*West Coast.*—*Fog-Signals near Dui.*—A gun, in addition to the fog-bell, has been established near Dui (Duö) lighthouse, but the gun will only be fired when reports are heard from seaward.

113.—SOUTH AUSTRALIA.—*Gulf of St. Vincent.*—*Port Wakefield.*—*Alteration of Light.*—A *fixed white* light, visible about 5 miles, is now shown instead of the red light.

114.—AUSTRALIA.—*East Coast.*—*Cumberland Islands.*—*Whitsunday Passage.*—*Light on Dent Island.*—From a lighthouse recently erected on the western side of the island; it shows a *revolving white* light, attaining its greatest brilliancy *every thirty seconds*, elevated 120 feet above high water, and visible from a distance of 16 miles; it is visible from the Anchor islands, through east, until shut into the northward by Cid island. The lighthouse, 33 feet high, circular in shape, and painted white, is situated about three-quarters of a mile from the southern extremity of Dent island. Position, lat. 20° 22′ 20″ S., long. 148° 58′ 20″ E.

115.—AUSTRALIA.—*North-East Coast.*—*Torres Strait*—*Prince of Wales Channel.*—*Buoy on Sunk Reef (d).*—A *can* buoy, painted black, is moored off the southern extremity of Sunk reef (d), in four fathoms at low water.

116.—NEW ZEALAND.—*Middle Island.*—*Foveaux Strait.*—*Light-Vessel and Jetty Light in Bluff Harbour.*—The light-vessel placed on the western side of the narrowest part of the entrance to Bluff (Awarua) harbour: it shows a *fixed white* light. The light-vessel, moored with four anchors (quarterly) swings in her own length, and lies with the following bearings and distances, viz.:

Triangle rocks (sunken), S.S.E., distant ¾ths of a cable; Burial

point, S. by E., distant 2 cables. Position approximate, lat. 46° 36′ 15″ S., long. 168° 22′ 20″ E.

Jetty light.—A *red* light is exhibited from the end of a jetty situated west 3 cables from the light-vessel.

Note.—Care should be taken by vessels dropping past the light-vessel, not to hook the moorings which extend 20 fathoms from her. Close to the light-vessel, there is a depth of 13 feet at low water spring tides—vessels drawing over 12 feet should not at low water come southward of the line joining the light-vessel and the northern face of the jetty. *Variation,* 16¼° *E.*

117.—United States.—*North Carolina.—Albemarle Sound.—Light near Laurel Point.*—From a lighthouse recently erected; it is a *white* light, showing a *flash* every 30 seconds, and illuminating the whole horizon; elevation 42 feet above mean low water, and visible about 12 miles. The structure is a hexagonal dwelling on screw-piles, surmounted with a lantern. Foundation, brown; superstructure, white; lantern red. It is placed in 9 feet of water, due north from Laurel Point. A *fog-bell* will be struck at intervals of 10 seconds, during thick and foggy weather. The approximate position is lat. 35° 59′ 48″ N., long. 76° 23′ 55″ W.

118.—Nova Scotia.—*South-East Coast.—St. Mary River Entrance.—Light on Wedge Island.*—Exhibited from a lighthouse recently erected. It is a *revolving red* light, showing for an interval of *one minute in* every *three minutes*, elevated 71 feet above high water, and visible from a distance of 12 miles. The lighthouse, 44 feet high, consists of a square tower, constructed of wood and painted white, with keeper's dwelling attached. Position as given, lat. 45° 0′ 35″ N., long. 61° 52′ 35″ W.

119.—Newfoundland.—*East Coast.—Bonavista Bay.—Light on Stinking Island.*—On 1st March, 1880, from a lighthouse recently erected on Stinking (Cabot) island, northern side of Bonavista bay:—It is an *intermittent white* light, the interval of light being about *eleven seconds*, and of darkness *nine seconds;* elevated 74 feet above the sea, and visible from a distance of 10 miles. The lighthouse, rising from the centre of the keeper's dwelling (square and flat roofed), is constructed of iron; the buildings are painted in red and white bands. Position, lat. 49° 10′ 25″ N., long. 53° 21′ 20″ W.

Hydrographic Notices recently Published by the Hydrographic Office, Admiralty, 1879.

No. 31.—China Sea Directory, Vol. III., Notice 12, China, east coast; information respecting portions of the north-east coast and rivers.

No. 32.—Eastern Archipelago, Notice 18; information relating to the Sulu or Mindoro sea, the east coast of Mindanas island, and to Macassar strait.

Hydrographic Notices recently published by the Hydrographic Office, Admiralty, 1880.

No. 1.—Vancouver Island Pilot, Notice 5; information relating to the coasts of Vancouver island and British Columbia.

No. 2.—Channel Pilot, Part I., Notice 1; England, south coast; additions and corrections.

No. 3.—Africa Pilot, Part III., Notice 8; information relating to the south-east coast between Natal and St. Lucia bay.

SHOAL IN THE JAVA SEA, NEAR BATAVIA.

The Board of Trade have forwarded to us for publication a communication lately received from A. P. Cameron, Esq., H.B.M. Consul at Batavia; it relates to a shoal recently discovered near Batavia road, and the following is a translation of the extract from the Official Gazette describing it:—

"The undersigned begs to inform those concerned that a reef has been discovered north of Batavia roads, to the eastward of Poloe Dapoer (Dapur island), and slightly further to the eastward than the reef marked (?) as doubtful, given on the chart of Batavia roads, Hydrographic Office, 1879. A *white buoy has been placed on the reef*. Bearings and soundings will be given at a later date.

The Vice-Admiral commanding the Naval Forces,
and Chief of the Marine Department, in Netherlands India,

(Ad.) Beutel de la Rivière."

OUR OFFICIAL LOG.

Official Inquiries at Home, 1880.

(This List is completed to the 18th of each Month.)

456. *Acacia*, s.s.; built at Port Glasgow, 1879; owned by Mr. J. S. Shaw, of Dublin; tonnage, 268; Liverpool to Pernau; salt; stranded on a shoal, near Sorkholm Island, July 14, 1879. Inquiry held at Dublin, January 3, 1880, before O'Donel, Stip. Mag.; Hight and Wilson, N.A. Casualty due to great neglect on the part of the master for knowingly taking the ship to sea with untrustworthy compasses, and for careless navigation. Certificate suspended for three months.

459. *Nith*, s.s.; built at Greenock, 1859; owned by Messrs. Barr and Rowan; tonnage, 141; Larne to Ayr; ballast; stranded on Ailsa Craig, November 19, 1879. Inquiry held at Glasgow, January 7, 1880, before Gilchrist and Jamieson, J.P.; Harris and Ward, N.A. Accident caused by mate altering the course. Certificate suspended for three months.

460. *Rathkenny*, s.s.; built at Newcastle-on-Tyne, 1856; owned by the Antrim Iron Ore Company; tonnage, 125; Belfast to Porthcawl; iron ore; stranded on Ballyferris Point, Ballywalter, October 29, 1879. Inquiry held at Belfast, January 8, 1880, before O'Donnell, Judge; Hight and Wilson, N.A. Master and officers free from blame.

461. *Ladyland;* built at Dumbarton in 1877; owned by Mr. J. Walker, of Glasgow; tonnage, 122; Glasgow to Port de Bouc; pitch; lost on the Skullmartin Reef, County Down, November 13, 1879. Inquiry held at Glasgow, January 7, 1880, before Dunlop and Bogue, J.P.; Harris and Ward, N.A. Master and mate both guilty of negligence. Certificates suspended for three months.

462. *Alfonso*, s.s.; built at Middlesboro', 1877; owned by Henry F. Craggs and others; tonnage, 181; Aarhuus to Ipswich; grain partly in bulk and the rest in bags; abandoned in the North Sea, October 18, 1879. Inquiry held at Middlesbro', January 7, 1880, before Coleman, Judge; Curling and Beasley, N.A. Vessel

thrown on her beam ends through the shifting of the cargo in consequence of a temporary bulkhead giving way. Master to blame for fitting an improper bulkhead in the vessel and for not using other and sufficient means to prevent the cargo shifting. Certificate suspended for six months.

467. *Beech*, s.s.; built at Sunderland in 1878; owned by Mr. R. Peacock and others; tonnage, 700; the Tyne to Cronstadt; general cargo; lost on the Doro Rocks, Cattegat, October 20, 1879. Inquiry held at North Shields, January 9, 1880, before Tully and Jackson, Justices; Beasley and Curling, N.A. Master guilty of an error of judgment; mate occasioned loss of vessel by his want of ability and judgment. Certificate suspended for six months.

468. *Mary Anne*, barque; built at Sherbrook, Nova Scotia, 1878; owned by Mr. P. Sutherland; tonnage, 592; Ayr to Boston; pig iron; foundered in St. Tudwall's Roads, Cardigan Bay, November 14, 1879. Inquiry held at Liverpool, January 12, 1880, before Raffles, Stip. Mag.; Forster, Castle and Parfitt, N.A. Loss ocasioned by faulty stowage of cargo—making centre of gravity too low. Master acquitted of default.

470. *Wepre Lass*, schooner; built at Flint, 1860; owned by Mr. G. Williams and others, of Carnarvon; tonnage, 44; Silloth to Dundalk; coals; foundered in the Solway Firth, September 30, 1879. Inquiry held at Liverpool, January 15, 1880, before Raffles, Stip. Mag.; Castle and Parfitt, N.A. The Court, upon the evidence adduced, were unable to assign any cause for the foundering; there were, however, circumstances of a suspicious nature in the case.

476. *Royal Arch*, barque; built at North Hylton in 1868; owned by Mr. R. G. New, of Liverpool; tonnage, 332; Liverpool to Halifax, Nova Scotia; salt; abandoned at Sea, November 2, 1879; also as to the loss of life on board previously. Inquiry held at Liverpool, January 17, 1880, before Raffles, Stip. Mag.; Forster, Castle and Parfitt, N.A. Abandonment justifiable, not from the unseaworthiness of the vessel, but from the debilitated state of the crew; everything possible was done to save the man who fell overboard, but at the time no boat could safely have been lowered.

477. *John Paxton*, barque; built at Sunderland in 1857;

owned by Messrs. J. and T. Trattles; tonnage, 289; stranded on Blakeney Sands, and subsequently lost on Bangaard Shoal, October 25 and 28, 1879. Inquiry held at North Shields, January 14, 1880, before Cleugh and Green, Justices; Beasley and Curling, N.A. Master in default for improper navigation; ordered to pay £20 towards costs of the inquiry as he had not a certificate to deal with.

478. *Pride of the Wear*, barque; built at Sunderland, 1859; owned by W. R. Hewison; tonnage, 373; Wisemar to Soderhaum; ballast; stranded on Bronskar Reef, October 26, 1879. Inquiry held at North Shields, January 12, 1880, before Stephenson and Green, Justices; Beasley and Curling, N.A. Master in default for neglecting to verify his position by the use of the lead. Certificate suspended for three months, but recommended for one as mate during that period.

479. *Erato*, ship; built at Ramsay, Isle of Man, 1864; owned by Mr. G. Lidgett, of London; tonnage, 1,205; Samarang to Falmouth for orders, and thence to Greenock; rum and sugar; damaged through striking the Barrel Rock, Carnsore Point, County Wexford, September 27, 1879. Inquiry held at Westminster, January 14, 1880, before Rothery, Wreck Commissioner; Harris and Ronaldson, N.A. Accident caused by improper courses having been steered when approaching the Irish Coast, and from the master leaving the ship in charge of an incompetent pilot, and becoming intoxicated. Certificate cancelled.

480. *Alton Tower*, s.s.; built at Newcastle in 1879; owned by Mr. F. Stumore and others, of Liverpool; tonnage, 1,279; Madras to Havre with general cargo, and from thence to London; lost near Lydd Coastguard Station, October 19, 1879. Inquiry held at Westminster, January 15, 1880, before Rothery, Wreck Commissioner; Holt, Harris and Ronaldson, N.A. Master to blame in mistaking Dungeness Light for a ship's light, and for neglecting to use the lead. Certificate suspended for three months, but recommended for one as chief mate during his suspension.

481. *Nora*, s.s.; built at Cork in 1861; owned by the General Steam Navigation Company; tonnage, 294; Amsterdam to London; general cargo, sheep and cattle; lost on the Bangaard

Bank, Coast of Holland, November 13, 1880. Inquiry held at Westminster, January 16, 1880, before Rothery, Wreck Commissioner; Harris, Ronaldson and May, N.A. Loss caused by the fires having been put out by shipping large quantities of water, and the vessel thus becoming disabled, drifted before the wind on to the coast. Master and officers free from blame.

482. *Heimdall*, s.s.; built at Gothenburg in 1875; owned by Mr. C. Howard, of London; tonnage, 976; Nicolaick to Bremerhaven; grain in bulk; abandoned and lost in the North Sea, when two lives were lost. Inquiry held at Westminster, January 13, 1880, before Rothery, Wreck Commissioner; Harris, Ronaldson, and Ravenhill, N. and E.A. Accident due to shifting of the cargo. The master's certificate was not dealt with.

483. *Roscommon*, s.s.; built at Wallsend in 1879; owned by C. S. Swan and Co.; tonnage, 968; Liverpool to Havannah; coals; foundered at sea; November 20, 1879, when loss of life ensued. Inquiry held at Liverpool, January 22, 1880, before Raffles, Stip. Mag.; Hight, Ward and Ravenhill, N. and E.A. Casualty caused by having shipped a heavy sea, which threw her on her beam ends, and from the shifting of her cargo, she finally turned completely over. No blame attached to master or officers.

484. *Sea Spray*, wood; built at South Hylton, Durham, in 1870; owned by Mr. R. T. Greenwell of Sunderland; tonnage, 299; London to East London, South Africa; railway iron and creosoted sleepers; lost by fire at sea, October 26, 1879. Inquiry held at Westminster, January 20, 1880, before Rothery, Wreck Commissioner; Ronaldson and Wilson, N.A. No blame due to master, officers, or crew.

486. *Despatch*, s.s., and *J. M. Lennard*, s.s. The former a paddle steamer used for trawling purposes; owned by Mr. J. H. W. Culleford; tonnage, 19. The latter on a voyage from the Tyne to Rouen with 340 tons of general cargo; in collision off Seaham, November 20, 1879, when one life was lost. Inquiry held at Middlesborough, January 22, 1880, before Coleman, Judge; Powell, Castle and Beasley, N.A. Mate of the *J. M. Lennard* to blame for not seeing that the masthead light of his vessel was

burning, and for leaving the bridge during his watch on deck. Certificate suspended for six months.

488. *Lynn Regis*, s.s.; built at Middlesborough in 1879; owned by Mr. W. F. Beaumont; tonnage, 349; Bilbao to Great Britain; iron ore; stranded and lost on the Ile aux Moutons, December 21, 1879. Inquiry held at Middlesborough, January 20, 1880, before Coleman, Judge; Powell, Castle and Beasley, N.A. Master guilty of negligent navigation. Certificate suspended for four months.

489. *Elcano*, barque; built at Falmouth, Maine, U.S., in 1855; owned by H. Nichol and others, of Belfast; Belfast to New York; ballast; struck on Hen and Chickens Rock, December 31, 1879. Inquiry held at Belfast, January 29, 1880, before O'Donnell, Judge; Hight and Ward, N.A. Master guilty of an error of judgment. Certificate not dealt with.

491. *Verity*, ship; built at Quebec, 1877; owned by Mr. J. G. Ross; tonnage, 1,022; Waterford to Sandy Hook; ballast; lost near Slyne Head, Coast of Galway, when loss of life ensued. Inquiry held at Liverpool, January 29, 1880, before Rothery, Wreck Commissioner; Parfitt and Wilson, N.A. Casualty and loss of life due to the vessel having been dismasted in a heavy squall. No blame attached to master.

493. *Borussia*, s.s.; built at Greenock in 1855; owned by the Dominion Steam Ship Company, Limited; tonnage, 1,320; Liverpool to New Orleans, *viâ* Corunna and Havana; general cargo and passengers; foundered at sea, December 2, 1879, when a loss of 154 persons took place. Inquiry held at Liverpool, February 6, 1880, before Rothery, Wreck Commissioner; Knox, Wilson, Hight and May, N.A. Court found that the vessel was not in seaworthy condition when she left Liverpool; that her leaky state and subsequent loss were probably attributable to some rivets having dropped out, or one or more of the butts, in the way of the engine-room, having started. The captain and chief engineer having been amongst the lost, it was not possible to determine whether proper measures were adopted to find to the whereabouts of the leak, or to keep the water down.

494. *Peruvian*, wood; built at Quebec in 1876; owned by

E. B. Hatfield and others, of Liverpool; tonnage, 1,059; Dublin to Philadelphia; old rails and scrap iron; abandoned at sea, December 12, 1879. Inquiry held at Dublin, February 7, 1880, before O'Donel, Judge; Forster and Ward, N.A. Accident caused by improper stowage of the cargo, whereby the centre of gravity was too low. Master free from blame.

494. *Thomas Turnbull*, wood; built at Whitby in 1862; owned by Thomas D. Woodhead, of Hull; tonnage, 347; Hartlepool to Buenos Ayres; coal; stranded and abandoned on Sherringham Beach, January 18, 1880. Inquiry held at Middlesborough, February 6, 1880. Master to blame for neglecting to verify his position and to use the lead. Certificate suspended for three months.

497. *Blue Cross*, s.s., and *Emerald;* the former built at North Shields in 1867; owned by Messrs. Smith and Luckley; tonnage, 1,075; Tyne to Genoa; general cargo; the latter a brigantine, built at Sunderland in 1857; owned by John Gann and others; tonnage, 184; Gravesend to Newcastle; chalk; in collision at the mouth of the Tyne, November 19, 1879. Inquiry held at North Shields, January 17, 1880, before Stevenson and Green, Justices; Curling and Beasley, N.A. Master of *Blue Cross* to blame for not easing his engines; admonished to be more careful in future.

498. *W. H. Atkinson*, s.s.; built at South Shields in 1873; owned by Mr. M. Cay and others; tonnage, 873; Alexandria to the Tyne; grain; lost in the Straits of Gibraltar, December 18, 1879. Inquiry held at North Shields, February 7, 1880, before Green and Swan, Justices; Castle and Parfitt, N.A. Master in default; certificate suspended for six months, but recommended for one as mate during that time.

Official Inquiries Abroad.

463. *Amy*, ketch; capsized on the bar of the Manning. Inquiry held at Sydney, November 3, 1879. No evidence adduced upon which to found a charge against the master.

464. *James Comrie*, s.s.; grounded when entering the River, vember 10, 1879. Inquiry held at Adelaide. Casualty due to

accident. Master cautioned as to the condition of the anchors and chains.

465. *Emu*, s.s.; grounded on the outer Bar, Port Adelaide, November 10, 1879. Inquiry held by the South Australian Board. Master did not exercise a wise discretion on entering the port on a dark night, but considering the large number of passengers he had on board they refrain from further censure.

466. *Kate Helena*, barque; abandoned at sea, November 7, 1879. Naval Court held at Valparaiso, December 3, 1879. Casualty due to stress of weather, and to no fault on the part of the master.

470. *John Watson*, schooner; lost on the Patiti Reef, November 22, 1879. Inquiry held at Timaru, November 29, 1879. No blame attached to master.

471. *Tapahan*, brigantine; taken aback and driven ashore at Seal Rock Point. Inquiry held at Sydney, November 20, 1879. Master to blame for navigating too close to the shore. Certificate suspended for three months.

472. *John Penn*, s.s.; stranded, and afterwards sunk, near Burra Warra Head, November 8, 1879. Inquiry held at Sydney, November 24, 1879. Master to blame for steaming at too great a speed in foggy weather. Certificate suspended for three months.

473. *Daisy*, s.s.; *Princess*, s.s.; in collision in Johnson Bay, Port Jackson, October 24, 1879. Inquiry held at Sydney, November 13, 1879. Both masters to blame for navigating so near the ships anchored in the harbour as to be unable to see each other. Both reprimanded.

475. *Lillian*, ketch; capsized by a squall whilst in stays, in Newcastle Harbour, November 17, 1879. Inquiry held at Newcastle, November 19, 1879. No blame attached to master.

485. *Flower of Yarrow*, schooner; lost on a reef near Samaton Island, October 17, 1879. Inquiry held at Singapore, December 4, 1879. No blame attached to master.

487. *Philosopher*, ship; lost off the Coast of Orissa, Bay of Bengal, September 26, 1879. Inquiry held at Calcutta, November 12, 1879. Accident due to the existence of an abnormal current which set the ship on the land.

490. *Thales*, s.s.; stranded on a reef near Quail Island and on North-West Reef, Torres Straits, on October 12 and 21, 1879. Inquiry held at Cooktown, October 30, 1879. Master much to blame for proceeding with his vessel in such hazy weather. Severely reprimanded.

492. *Emily Miller*, ketch; driven ashore by the heavy swell during a calm, near Wasp Islet, November 19, 1879. Inquiry held at Sydney, December 8, 1879. Master guilty of an error of judgment in not anchoring as the water shoaled, for which he was censured.

496. *Marie*, barque; abandoned at sea. Naval Court held at Valparaiso, December 19, 1879. Abandonment justifiable.

GENERAL.

Customs Regulations at Spanish Ports.—Caution to Shippers and Masters.—The Board of Trade give notice to shippers and masters of vessels that the Spanish authorities will impose a fine upon any vessel, whether laden or in ballast, which arrives at a Spanish port without a manifest properly vised by the Spanish Consul at the port of departure in the United Kingdom, or at the last foreign port from which the vessel cleared before proceeding to Spain; or in the absence of such consul, by the local or Customs authorities. The Board of Trade further give notice that the whole of the cargo of a vessel "proceeding to a port in Spain" must be declared in the manifest, although only a portion of it has been shipped for that country. If shippers or masters have any complaint to make against a Spanish Consul, either because he refuses to attach his visa to a manifest, or alleges that it is not required, they must obtain some written document from the Consul, stating his reasons for not complying with such formalities, as a mere verbal statement will not be considered as sufficient evidence either by the Customs authorities at the port of arrival, or by the higher authorities, to whom appeal may ultimately be made in consequence of the infliction of a fine.—Thomas Gray, Assistant-Secretary.—Board of Trade, January, 1880.

THE

NAUTICAL MAGAZINE

FORTY-NINTH YEAR.

VOLUME XLIX.—No. IV.

APRIL, 1880.

THE IMMUNITY OF PUBLIC SHIPS FROM CIVIL ARREST.

THE CASE OF THE "PARLEMENT BELGE."

IT is just sixty years since the question was first raised in the High Court of Admiralty of England as to the liability of a public ship of a foreign State to be arrested, whilst lying in a British port, in a civil action at the suit of a British subject. It was stated on that occasion, both by the King's Advocate-General and by the Admiralty Advocate, who appeared under protest for the commander of the Dutch ship-of-war, the *Prins Frederik*, that there was no precedent in the annals of the Court, nor, as far as they were aware, in the annals of any other Admiralty Court, for such a proceeding. The claim in the case of the *Prins Frederik* was for salvage remuneration by reason of services performed to the ship and her cargo by two of the crew of an English merchant vessel, who had been taken on board of the *Prins Frederik* off the Scilly Islands, and had conducted her safely into Mount's Bay. They subsequently extracted a warrant of arrest against the ship and her cargo from the Admiralty Registry, and arrested them in the harbour of Plymouth, where, pursuant to the then existing

practice of the Admiralty Court in proceedings *in rem*, an officer of the Court was left in possession of the vessel, who was, however, shortly afterwards dispossessed by the commander of the Dutch ship, and compelled to quit the vessel. An attachment was thereupon moved for in Court against the commander of the Dutch ship, but the Judge directed the matter to stand over, and meanwhile an appearance was given for the commander of the Dutch ship under protest to the jurisdiction of the Court. The Crown Advocates on this occasion objected to the Admiralty Court arresting the Dutch ship on two grounds: 1st, That she was a ship of war, not of commerce, and that articles of commerce were alone the subjects of a maritime lien, which implies the power of conversion; and 2nd, That the ship was a public vessel of a foreign Sovereign, and as such was exempt from the ordinary process of the English Courts, although she was within English territory. Two cases only were known to the Crown Advocates as having some analogy to the case before the Court, in which private demands had been set up against public ships. The first was the well-known case of the three Spanish ships of war arrested at Flushing, by civil process, for a debt of the King of Spain, which are mentioned by Bynkerschock, in his "Treatise de Foro Legatorum," c. 4, and which were released upon the representations of the Spanish Ambassador. The second case was a cause then recently decided in the Supreme Court of the United States of America upon an appeal from a District Court of Admiralty, and which has been subsequently reported in the seventh volume of Cranch's American Reports, p. 114, under the title of "The Schooner *Exchange* v. McFaddon and Others." This latter case is one of high authority, and the judgment in it was delivered by Chief Justice Marshall, whose eminence as an international jurist is hardly second to that of Lord Stowell. "By the unanimous consent of nations," says Chief Justice Marshall, "a foreigner is amenable to the laws of the place; but certainly in practice nations have not yet asserted their jurisdiction over the public-armed ships of a foreign sovereign entering a port open for their reception;" and, again, "It seems then to the Court to be a principle of public law, that

national ships of war, entering the port of a friendly Power open for their reception, are to be considered as exempted by the consent of that Power from its jurisdiction."

Lord Stowell (then Sir William Scott) abstained from giving any judgment in the case of the *Prins Frederik*, but he suggested a doubt as to whether it was a salvage case upon the affidavits before the Court, and that, if there had been any salvage services, they were of so slight a nature as to be hardly sufficient to justify the raising a question as to the jurisdiction of the Court upon a very nice and delicate subject. The result was that the case was further directed to stand over, and a memorial was meanwhile presented on behalf of the salvors to the Ambassador of the Netherlands in London, who, after consultation with the Dutch Government, requested that the amount of recompense due to the claimants should be submitted to the award of Sir William Scott. In consequence of this arrangement the case was not again mentioned in Court, but it appears from the award of Sir William Scott, that there was a cargo of spices, &c., on board the *Prins Frederik*, which was of the value of upwards of £27,750, and he awarded to the salvors £800, together with their expenses. The case of the *Prins Frederik* is only thus far of authority, as showing that Sir William Scott *hesitated* to exercise jurisdiction over "a ship of war belonging to a foreign State," such being the language in which the learned Judge describes the *Prins Frederik*. The reasoning, however, of the Crown advocates in that case, has been upheld by a series of subsequent judgments in the High Court of Admiralty of England, as incontrovertible as far as a public ship of war is concerned, and the Supreme Court of the United States has laid down the same principle in the most absolute manner in the case already cited, viz., "The Schooner *Exchange v.* McFaddon and others."

The present learned Judge of the High Court of Admiralty of England has ably stated the law as now received in English Courts on the subject of foreign ships of war. "Long usage and universal custom entitle every such ship to be considered as part of the State to which she belongs, and to be exempt from any other jurisdiction. Whether this privilege be founded on strict

international right, or upon an original concession of comity with respect to the State in its aggregate capacity, which by inveterate practice has assumed the position of a right, is a consideration of not much practical importance. But it is of some importance, for if the better opinion be, as it would seem to be, that the privilege in question was originally a concession of comity, it may, on due notice being given, be revoked by a State so ill-advised as to adopt such a course, which could not happen if it were a matter of natural right. But unquestionably in the case of the foreign ship of war, as of the foreign Sovereign and Ambassador, every State, which has not formally notified its departure from the usage of the civilized world, is under a tacit convention to accord this privilege to the foreign ship of war lying in its harbours."—"Phillimore's Commentaries on International Law." Vol. I., sec. cccxliv., 3rd Edition, 1879.

We do not propose on the present occasion to discuss the somewhat subtle question whether the exemption of a ship of war from the jurisdiction of a foreign State, when she is lying within its territorial waters, is a perfect right, or a long-established privilege founded on the comity of nations. Different views of this question have been maintained by high authorities. Lord Chief Justice Cockburn, in the opinion delivered by him, as one of the arbitrators in the Alabama question, has adopted the view that the exemption of a ship of war from the territorial jurisdiction of a foreign State, within whose territorial waters she may be lying, is a perfect right, whilst the joint opinion of the other four arbitrators was to the effect "that the privilege of extra-territoriality accorded to vessels of war has been admitted into the Law of Nations, not as an absolute right, but solely as a proceeding founded on the principle of courtesy and mutual deference between nations."—"Alabama Blue Book," p. 207. This difference of opinion between such high authorities is not altogether without importance in its bearing on the conduct of the parties in such a case as the *Prins Frederik*, where the commander of the ship of war had resented the service of the process of the Admiralty Court, and ejected its officer. The nature of the service of the Admiralty process when a ship is arrested in a civil action *in rem*, is

altogether repugnant to the dignity of the State, to which a public ship belongs, and is also inconsistent with the spirit of the commission of her commander. He is, in fact, dispossessed of his ship, when it is arrested by the marshal of the Admiralty, or by the marshal's deputy, who, after he has boarded her, under the authority of the Silver Oar of the Admiralty,* claims to nail the warrant of the Admiralty Court to the ship's mast, and to keep possession of the ship until it is released by an order of the Court. It is not, therefore, surprising to find it stated in the case of the *Prins Frederik*, as already observed, that the person who had been left in possession of the Dutch ship of war under the authority of the English Admiralty Court was shortly afterwards dispossessed by her commander, and compelled to quit the ship; the vessel herself was, nevertheless, detained in the harbour of Plymouth, under the authority of the Admiralty warrant, for six months. The mode in which Sir William Scott has dealt with this part of the case is suggestive that he considered the immunity of a foreign ship of war from arrest by the Admiralty Court to rest upon comity, well established indeed, under a common understanding between nations, but not giving rise to a perfect right, which would have been violated in the case of the *Prins Frederik* by the arrest of the vessel, and would have afforded just ground of complaint on the part of the Dutch Ambassador.

The case of the *Parlement Belge*, which was heard before the Admiralty Division of the English High Court of Justice in 1878, and has been subsequently appealed to the Supreme Court of Judicature, is not a case on "all fours" either with the *Prins Frederik* or the schooner *Exchange;* otherwise it might have been presumed that the Judge of the Admiralty Division of the High Court would have dealt with it precisely in the same principle, upon which he had shortly before refused to allow a warrant of arrest to "issue at the suit of certain salvors against the

* The jurisdiction of the Silver Oar of the Admiralty has been discussed in the June number of the *Nautical Magazine* of 1877, Vol. XLVI., pp. 572 *et seq.*

United States frigate, *The Constitution*."* The *Parlement Belge* was not a public ship of war, but she was a public ship of the Belgian Government, sailing under the Royal pennon, and commanded by officers holding commissions from His Majesty the King of the Belgians, and in the pay and service of his Government. She had come into collision off Dover, whilst carrying the public mails from Ostend to Dover, with the British steamtug *Darling*, in February, 1878, and the owners of the steamtug had made application to the Admiralty Court for a warrant of arrest against the Belgian mail-packet by reason of the collision. The course of proceeding in this case had been slightly different from that which was observed in the case of the *Prins Frederik*, inasmuch as the practice of the Admiralty Division of the High Court of Justice has been varied under the recent Judicature Acts from that which prevailed formerly in the High Court of Admiralty. The salvors had already, according to the new rules of practice, served a writ on board of the Belgian steamship, and in deference to the writ the agent of the steamship had given an appearance in the Registry, but had taken no further steps in the matter. The plaintiffs had thereupon proceeded by default, and after the usual defaults gave notice in the Registry that they would apply to the Court for judgment and for a warrant to arrest the ship. Under these circumstances, the Judge of the Admiralty Court, considering that the relations of the Crown with a foreign State might be affected if the case proceeded further, directed a communication to be made to the proper officer of the Crown, and the result was that H.M. Attorney-General and Solicitor-General appeared on behalf of the Crown and filed an information and protest to the effect, "that the Admiralty Court had no jurisdiction to entertain the suit, and that the plaintiff could not prosecute the same therein." The Crown lawyers rested their protest on two grounds, first, that the Belgian steamship was a public vessel of the Belgian Government sailing under the pennon of the King of the Belgians, and under the command of an officer of the Royal Belgian Navy holding a com-

* The case of *The Constitution* is reported in "Mitchell's Maritime Register" of Jan. 29, 1879.

mission from the King of the Belgians, and in the pay of the Belgian Government; and, secondly, that the Belgian steamship at the time of the collision was employed as a Belgian mail-packet in carrying the public mails from Ostend to Dover in accordance with the provisions of a Convention concluded between the Queen of Great Britain and the King of the Belgians, under which the Belgian mail-packets are entitled within British ports to be considered and treated as vessels of war. The first of these objections, it will be seen, raised a question of international jurisprudence; the second resolved itself into a question of positive law. The learned Judge of the Admiralty Division of the High Court of Justice over-ruled the protest of the Crown lawyers on both points, and decreed a warrant of arrest to issue against the *Parlement Belge*, being of opinion, "that neither upon principle, precedent, nor analogy of general international law was he warranted in considering the *Parlement Belge* as belonging to the category of public vessels exempt from process of law and all personal claims."*

Three main questions were raised by the Crown lawyers before the Appeal Court:—1st, whether, irrespective of the Postal Convention, the Admiralty Court had jurisdiction to seize the Belgian vessel in a suit, *in rem;* 2nd, whether, if the Court had such jurisdiction, it was not ousted by the Postal Convention; 3rd, whether an exemption from the jurisdiction of the Admiralty Court, to which the mail-packet might be otherwise entitled, had not been forfeited by reason of her trading in the carriage of goods and passengers? The Court directed the first and third questions to be argued in the first place, reserving the second question, if it should think it necessary to hear an argument upon it. It ultimately decided that it was unnecessary to hear any argument on the second question, and determined the case upon considerations of international jurisprudence, irrespective of the Postal Convention. The result was that the Court of Appeal reversed the judgment of the Admiralty Division of the High Court of Justice with a declaration

* We quote these words from a very full report of the judgment of the Court of Appeal, published in *The Times* newspaper of Saturday Feb. 28, 1880.

that the latter Court had no jurisdiction over the *Parlement Belge*.

The reasons for this judgment of the Court of Appeal have been virtually set forth by anticipation in the arguments addressed by the Crown advocates to Sir William Scott, in the case of the *Prins Frederik*. Upon these arguments Lord Justice Brett, who delivered the judgment of the Appeal Court, commented very fully, observing that the argument of Dr. Arnold, the Admiralty advocate, in that case was an argument of the closest and most forcible reasoning, to which their Lordships saw no answer. "The point and force of that argument," the Lord Justice goes on to say, "is that the public property of every State, being destined to public uses, cannot with reason be submitted to the jurisdiction of the Courts of such State, because such jurisdiction, if exercised, must divert the public property from its destined public uses, and that by international comity, which acknowledges the equality of States, if such immunity grounded on such reasons exist in each State with regard to its own public property, the same immunity must be granted by each State to similar property of all other States. The dignity and independence of each State requires such reciprocity." The Lord Justice having thus enunciated an important principle of international jurisprudence, proceeded to show, by reference to English and American cases, that this principle has been applied by the Courts both of Great Britain and of the United States to vessels which were not vessels of war, but were the public property of the State in each case, and were employed by the State for public uses, and he cited as instances of such application the judgment of Dr. Lushington, in the case of the troopship *Athol* (I.—W. Robinson's Reports, p. 374), and the judgment of the Supreme Judicial Court of Massachusetts, in the case of "Briggs *v.* the Lightships" (XI. Allen's American Reports, p. 157), and from the latter case he further cited certain expressions of the Court, as showing the ground of its judgment, viz., that the public property of a Government, in use for public purposes, is beyond the jurisdiction of the Courts of its own State or of any other State, and that ships of war are beyond such jurisdiction, not because they are ships of war, but because they

are public property." The Lord Justice then proceeded to discuss the third question, whether the immunity of the *Parlement Belge* was lost by reason of the ship having been used for trading purposes. Having expressed some doubts as to the competency of the Court to make enquiry as to the uses of the ship, after the ship had been declared in the usual manner by an independent Sovereign to be a public vessel of the State and to be used for national purposes, the Lord Justice proceeded to express the opinion of the Court that the *Parlement Belge* had been mainly used for the purposes of carrying the mails, and only subserviently to that main object for purposes of trade; that the carrying of passengers and merchandise had been subordinated to the duty of carrying the mails, and the steamship had not thereby been brought within the category of a mere trading ship, as she was used substantially for national purposes. It may deserve remark, although the Lord Justice thought it unnecessary to allude to the fact, that the Crown advocates, in the case of the *Prins Frederik*, had thought it wise to combat the possible objection that the *Prins Frederik* was not entitled to the character of a ship of war by reason of her having valuable spices, &c., on board as cargo, and Dr. Arnold, the Admiralty advocate, had maintained that such a circumstance did not affect the public character of the *Prins Frederik*, and that as she was sailing in the service of the State, under the flag and commission of the State, she was entitled to all the privileges of a ship of war, and to exemption from arrest by the civil process of the Admiralty Court.

We welcome this Judgment of the Supreme Court of Judicature with the highest satisfaction, first, as showing that the principles of jurisprudence, which Lord Stowell administered in the ancient High Court of Admiralty of England, are fully appreciated by the Lords Justices of the Supreme Court, to which all appeals in Admiralty cases have been recently transferred by the Judicature Acts, and that they are resolved, as an Appellate Court, to constrain the Admiralty Division of the High Court of Justice to maintain those principles, and to apply them with due discrimination to new cases as occasion may require; and, secondly, because they have ennunciated, in clear language, the true grounds

upon which a foreign ship may claim the privilege of so-called extra-territoriality when she is lying within British waters, namely, when she is a public ship of a foreign State, employed for its public uses, from which she cannot be diverted without prejudice to the independence and sovereign authority of the State itself, whose commission to her commander is an adequate warrant of her character. It is not the circumstance that she is a ship of war which entitles her to an exemption from the jurisdiction of all other States, but the circumstance that she is a public ship, which represents the sovereignty of her own State. We may add that this cardinal principle of international jurisprudence has a further illustration in the practice of nations in time of war, according to which it is held to be consistent with the neutrality of a State to extend to a public ship of a belligerent State an hospitality within its ports, which it is at liberty to deny altogether to a belligerent privateer.

TRAVERS TWISS.

LIGHTS OF FISHING VESSELS.

LORD SANDON, the President of the Board of Trade, has decided that the new regulations relating to the lights of fishing vessels, contained in Article 10, shall be put off for another year. This being so, our readers will have to bear in mind that the repealed Article 9 of the old regulations will be resuscitated, and will remain in force for a time. As there is very great confusion in the matter in the minds not only of fishermen themselves, and of the masters and officers of other ships, but also in the minds of lawyers and in Courts of Law, concerning the lights that fishing vessels are now really required to carry, we may be doing useful service in making a plain statement of the law, the facts, and the practice. This we are enabled the more easily to do at this moment owing to an exceeding valuable report (just presented to Parliament), and made by Mr. Thomas [illegible]ray and Captain Murray, of the Board of Trade, and Captain [illegible]ller, of the Trinity House.

The existing regulations applicable to fishing vessels are as follows:—

"Art. 3. Seagoing steamships when under weigh shall carry:

"(a.) *At the Foremast Head*, a bright white light, so fixed as to show an uniform and unbroken light over an arc of the horizon of 20 points of the compass; so fixed as to throw the light 10 points on each side of the ship, viz., from right ahead to 2 points abaft the beam, on either side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least five miles:

"(b.) *On the Starboard Side*, a green light so constructed as to show an uniform and unbroken light over an arc of the horizon of 10 points of the compas; so fixed as to throw the light from right ahead to 2 points abaft the beam on the starboard-side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles:

"(c.) *On the Port Side*, a red light, so constructed as to show an uniform and unbroken light over an arc of the horizon of 10 points of the compass; so fixed as to throw the light from right ahead to 2 points abaft the beam on the port-side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles:

"(d.) The said green and red side-lights shall be fitted with in-board screens, projecting at least three feet forward from the light, so as to prevent these lights from being seen across the bow."

"Art. 5. Sailing ships under weigh, or being towed, shall carry the same lights as steamships under weigh, with the exception of the white mast-head lights, which they shall never carry.

"Art. 6. Whenever, as in the case of small vessels during bad weather, the green and red lights cannot be fixed, these lights shall be kept on deck, on their respective sides of the vessel, ready for instant exhibition; and shall, on the approach of or to other vessels, be exhibited on their respective sides in sufficient time to prevent collision, in such manner as to make them most visible, and so that the green light shall not be seen on the port-side, nor the red light on the starboard-side.

"To make the use of these portable lights more certain and easy, the lanterns containing them shall each be painted outside with the colour of the light they respectively contain, and shall be provided with suitable screens.

"Art. 7. Ships, whether steamships or sailing ships, when at anchor in roadsteads or fairways shall exhibit, where it can best be seen, but at a height not exceeding twenty feet above the hull, a white light, in a globular lantern of eight inches in diameter, and so constructed as to show a clear uniform and unbroken light visible all round the horizon, and at a distance of at least one mile."

"Art. 9. Open fishing boats and other open boats shall not be required to carry the side-lights required for other vessels; but shall, if they do not carry such lights, carry a lantern having a green slide on the one side and a red slide on the other side; and on the approach of or to other vessels, such lantern shall be exhibited in sufficient time to prevent collision, so that the green light shall not be seen on the port-side, nor the red light on the starboard-side.

"Fishing vessels and open boats when at anchor, or attached to their nets and stationary, shall exhibit a bright white light.

"Fishing vessels and open boats shall, however, not be prevented from using a flare-up in addition, if considered expedient."

If the law, such as it is, were complied with, there might be less difficulty than there is; but the law is not complied with. First, as to trawlers, the Report points out—

"Under the above rules which form the present law—

"(1.) A trawler that is *not* 'stationary' *when her trawl is down*, is required to show her green and red side-lights properly fixed and fitted with screens in their places, unless the vessel is so small and the weather is so bad that she cannot keep them up, and in that case, and during the bad weather, she is to carry them on deck at their proper sides, ready for instant exhibition.

"(2.) When she is at anchor, or when her trawl is down and

she is stationary, she is not now required to show her side-lights; but is to show a bright white light, in an 'all-round' lantern.

"(3.) She may at any time, and whether at anchor or under way, show a flare-up if expedient.

"*Existing Practice.*

"What the fishermen inform us a trawler actually does now, as a rule and in face of the law, is to show when her trawl is down and when she is at work, that is to say, when she is going over the ground at from half a knot to three knots an hour, a bright white light in an 'all-round' lantern. The method of carrying the present illegal light while at work, will be seen on reference to Diagrams numbered 1, 2, and 3 in the Appendix to the Report. This light, as will be seen, is carried at a crane at the fore-mast-head in some cases, and in others at the crosstrees, sometimes on the weather crosstree and sometimes on the lee one; and the vessel sometimes shows a flare-up, but she rarely shows her coloured side-lights. In some exceptional cases, however, we learnt that a trawler has, when at work, shown her side-lights as well as the illegal white masthead light. Thus, when she shows the white light only, she appropriates to herself the light of a ship at anchor, or a stationary ship, or the light of a pilot vessel; and when she shows, in addition to her side-lights, the white masthead or crosstree light, she assumes the distinctive lights of a steamship under way. When her trawl catches in the ground and she in consequence becomes immovable, she displays two white lights. It is not surprising that approaching merchant ships are puzzled: and that collisions occasionally occur.

"At the same time we think that the very fact of the trawlers exhibiting this white light at their masthead shows that they are of opinion that their safety is imperfectly provided for by the side-lights and flare-up light of the existing regulations."

Secondly, with reference to drifters—

"As regards the lights of these vessels there is also at present some confusion and law breaking, which is not altogether unreasonable under the circumstances.

"*Existing Regulations.*

"The existing international regulations require that—

"'Fishing vessels and open boats when at anchor, or attached to their nets and stationary, shall exhibit a bright white light.

"'Fishing vessels and open boats shall, however, not be prevented from using a flare-up in addition, if considered expedient.'

"*Existing Practice.*

"The existing practice is not uniform. Until recently many of the drift-net fishing boats, when at work, showed two white lights; at the present time most of those at Penzance and neighbouring ports show, we are informed, one only. The two white lights when shown were generally placed one above the other on a stanchion or upright amidships, about three feet apart. Or, on the East Coast, on a stay from the mizen mast. If one white light is shown, it is generally carried on a stanchion or on an upright in the same way, and is fairly represented by the lower of the two lights in diagram 4; but we do not find that it is ordinarily carried on one of the masts used for the sails. The drift-net boats hailing from the Cornish ports are much smaller than the trawlers, and do not, as a rule, carry their side-lights fixed and in their places, but they carry one lantern having the red and green slide, to exhibit the red or green side-light to approaching ships. They also carry, and when necessary use, the flare-up. The white lights carried by the drifters, when drifting with their nets are often exceedingly powerful lights, and are of use not only to make the presence of the drifter known to other vessels, but to throw light on the deck of the drifter to enable the crew to see to work."

In the event of any collisions between merchant ships and fishing vessels trawling, it is highly important that the master of the merchant ship should in future have the benefit of the statements contained in this Report. It is quite clear that fishing vessels do not comply with the existing law as to side-lights when they are not fishing; while, in the case of trawlers at work, the Report also shows that the law is disregarded. The Report on point is as follows:—

"We find—

"First that the existing regulations as to lights are, as a general rule, disregarded.

"Secondly, that trawling vessels carry, while at work, a white light which has never been authorised by any regulations whatever; and

"Thirdly, that much confusion must have arisen through the trawlers having thus made a law for themselves outside all authorised regulations.

"Fourthly, that the owners of trawling vessels wish the international regulations to be specially and expressly altered, with a view to enabling their vessels to continue to carry the present (illegal) white light."

In fact, the white light of trawlers is an illegal light; it misleads approaching ships by presenting the light of a vessel at anchor, instead of a vessel proceeding through the water, and so it happens that a merchant ship trying to pass ahead of what appears by its light to be a stationary ship, but which is in reality a ship under way, runs it down. As it has never yet been made clear in Court that this white light is an illegal light, the ship has had to pay; but now that the Report we have referred to has been given to the world, we have no doubt whatever that both the counsel for the master and the Courts will regard these cases from a different point of view.

NOTES ON THE EQUATORIAL CURRENTS OF THE EASTERN PACIFIC.

To the Editor of the "Nautical Magazine."

Stockwell, 3rd March, 1880.

SIR,—The accompanying paper has been sent to me by Mr. James Galbraith for perusal. It shows that some of the currents in the Pacific Ocean are not what they have hitherto been shown to be, and its value to the mariner is very great. I have much pleasure in being permitted to send it to you for insertion in the

Nautical as it is quite worthy of a prominent place in your pages. The announcement it contains is of first-rate importance; whilst the care with which the facts are recorded reflects great credit on the officers of the British Merchant Service.

Faithfully yours,

THOMAS GRAY.

Having been employed during the year 1878 running the s.s. *Peruvia*, 3,445 tons gross (late *Nemesis* of London), between China and Peru, the following narrative will be found to contain my experiences in the Pacific Ocean, with an account of the winds, weather, and currents (particularly the latter), as I found them in my various voyages.

Before leaving London, in October, 1877, I supplied myself with the latest charts, and the best books of directions I could get, and being a complete stranger in Pacific waters, I consulted with several of the captains of the steamers plying betwixt Hong Kong and San Francisco as to the best route to take in crossing to Peru, *viâ* the Sandwich Islands.

With the information gathered from various sources, I made up my mind to proceed to Honolulu on the "Great Circle" track, and after leaving Honolulu to pass out betwixt the islands of Oahu and Morotoi; then steam straight to the eastward, until I could make a fair wind of the north-east trade wind; then get into the Equatorial counter current without loss of time, and, having got nearly to the Galapagos Islands, steer straight for Callao.

Having left Hong Kong on the 13th January, 1878, I came across to Honolulu, arriving there on the 3rd February; after landing passengers, &c., I left again at three p.m. on the 4th, and found, as I cleared the land, a strong breeze from the E.N.E. As we had met with but very light "Trades" approaching the Islands, I fully expected to find the breeze lull down, but in this I was disappointed; as we proceeded to the eastward it increased in force, and hauled to E. by N., and sometimes east. I noticed also that we were getting into a very confused sea, and on working up the position on the 5th found we had had a current setting to the westward about ¾ of a knot per hour.

I determined to try on hoping for better things; but, by 8 a.m. the following day, I had to abandon my attention of getting to the eastward by this route. The wind was steady at east, pressure about 6, with occasional rain squalls, the sea very confused; there was first the sea from the eastward belonging to the wind, then from the N.N.W. came a long deep swell, and occasionally another from the W.N.W. was quite perceptible. The effect of this mixture may be imagined; we would go along steadily for five or ten minutes, and then get suddenly brought up by a slap on the bows, which would make the ship quiver from stem to stern, what with the rolling and pitching, and the speed down to five knots, I kept away to the southward under fore-and-aft canvas, my object now being to make easting as opportunity offered, gain the Equatorial counter current, and proceed according to my first intentions.

As we edged down the "Trades," the wind clung steadily to the east, occasionally drawing a little to the southward, and day by day the current increased till it got to 25m. in the 24h., on the 11th day of February, in lat. 12° 08′ N., long. 137° 37′ W.

For the next two days I had no current. The wind being now from the N.N.E., I hauled away to the eastward, trying for the counter current, but with no success. On the 15th February, our position was 4° 43′ N., 125° 0′ W., and a current to the W.S.W. 30m.! in the 24 hours.

I kept edging along to the eastward, hoping to get a help towards my port, but from the 15th to the 21st inst., when our position was 0° 22′ S., 103° 59′ W., we had a current to the W.S.W. and west, varying from 20 to 30m. a day.

On the 22nd, I found that the current had completely changed its courses, having set N.N.W. 20m. in the last 24 hours. The next day it had resumed its old direction to the west, and then W.N.W., but now diminishing in strength, until on the 26th, in lat. 7° 59′ S., long. 90° 52′ W., we had no current at all. From this into Callao 9m. was the strongest we had in the 24h., until getting into the dirty green water off the coast, where we found a sharp set to the N.W. We anchored in Callao after a passage of 25

days 20 hours from Honolulu, which includes a stoppage of six hours for repairs.

After losing the N.E. trades, we had variable winds with lots of rain, but generally a smooth sea.

We picked the S.E. trades up in 1° south, and I noticed there was a hard patch in them south of the Galapagos Islands, in which the wind kept steady at east and E. by S., with pressure about 5.

The barometer was very regular in its movements; about 10 a.m. it would commence falling, and by 2 p.m. it would be down about $\frac{15}{100}$, then it would begin to rise again to its usual range, 30·10. This went on day after day, with but very slight variation, especially between the latitudes of 10° N. and 10° S.

I found very little difference in the compass deviation between the China Sea and the Sandwich Islands, but on getting to the eastward of the islands I noticed a marked difference both outward and homeward bound. I always work with "Napier's diagrams," and kept two curves, one for the eastern half of the voyage and one for the western.

During our stay in Callao, I thought a good deal over the best route for the homeward passage, and profiting by my outward experiences, I determined to try a straight line for it. My belief in the existence of an equatorial counter current was considerably shaken coming out, and the straight line course would prove whether it had an existence or not.

On the 21st March we finished our lading, and left Callao for Honolulu and Whampoa. By noon we were well clear of the Hormigas-de-Afuera, and by noon next day were 262m. on our journey, with a current to the W.N.W of 14m. Having passed through the patch of no current which I noticed in my outward run, we soon came up with the westerly set again. The wind, I noticed, in these regions, was much stronger from 9 a.m. until 5 p.m. than during the rest of the 24 hours. On the 27th March our position was 3° 36′ S., 102° 22′ W., and the current was 32m. to the westward. Next day, in 2° 16′ S., 106° 13′ W., I found it had dwindled down to 8m. only, while on the next two days I had 23m. and 1m. respectively to the *eastward!*

I edged to the north a little, and had the satisfaction of finding we were again in the westerly current next day, although it only amounted to 5m. for the 24 hours. Our position this day was 2° 49′ N., 116° 35′ W., and from this (the 31st March) until our arrival in Honolulu, on the 10th April, we had a steady current of from 32m. to 15m. to the westward day by day.

This was very satisfactory evidence that the "counter current" does not have an existence in the month of April in the limits assigned to it, either by the Admiralty charts or the Blue chart by Laurie.

With the experience of two passages, it struck me that the equatorial counter current must either change its position with the season of the year, or else was to be found south and not north of the Equator, and as I still thought a good passage might be made to Callao from Honolulu, by the northern route, if the trade wind only kept steady and moderate in force, I determined to give it one more trial on my next voyage.

On the 17th September we again arrived in Honolulu *en route* for Callao, and left on the 18th at 8 p.m.

I steamed away to the eastward, as on my last voyage, and having had a steady, but not very light, trade wind approaching the islands from the westward, I hoped that I should have a continuance of it to the eastward.

I was again disappointed, for hour by hour as we cleared the land the breeze increased steadily in force, and settled down at E. by N.; the same experiences met us, as we went on, that had baulked our outward passage last voyage. I kept on until we reached lat. 22° 21′ N., long. 149° 26′ W., the current had set N. 62° W. 13m. during the last 24 hours, the wind had a hard angry look about it, and the sea was high and confused. I therefore kept away to the southward, braced the yards sharp up, set all sail, and steered "full and bye;" by noon next day we had made 234m., and an exceedingly weatherly course, having only lain up about S. by E. true.

The next day, in about lat. 15° N., we ran out of the trade wind, and steered down S.E.; again we had made such a weatherly course that I had reason to think we had had a little easterly current.

upon which a foreign ship may claim the privilege of so-called extra-territoriality when she is lying within British waters, namely, when she is a public ship of a foreign State, employed for its public uses, from which she cannot be diverted without prejudice to the independence and sovereign authority of the State itself, whose commission to her commander is an adequate warrant of her character. It is not the circumstance that she is a ship of war which entitles her to an exemption from the jurisdiction of all other States, but the circumstance that she is a public ship, which represents the sovereignty of her own State. We may add that this cardinal principle of international jurisprudence has a further illustration in the practice of nations in time of war, according to which it is held to be consistent with the neutrality of a State to extend to a public ship of a belligerent State an hospitality within its ports, which it is at liberty to deny altogether to a belligerent privateer.

TRAVERS TWISS.

LIGHTS OF FISHING VESSELS.

LORD SANDON, the President of the Board of Trade, has decided that the new regulations relating to the lights of fishing vessels, contained in Article 10, shall be put off for another year. This being so, our readers will have to bear in mind that the repealed Article 9 of the old regulations will be resuscitated, and will remain in force for a time. As there is very great confusion in the matter in the minds not only of fishermen themselves, and of the masters and officers of other ships, but also in the minds of lawyers and in Courts of Law, concerning the lights that fishing vessels are now really required to carry, we may be doing useful service in making a plain statement of the law, the facts, and the practice. This we are enabled the more easily to do at this moment owing to an exceeding valuable report (just presented to Parliament), and made by Mr. Thomas Gray and Captain Murray, of the Board of Trade, and Captain Weller, of the Trinity House.

The existing regulations applicable to fishing vessels are as follows:—

"Art. 3. Seagoing steamships when under weigh shall carry:

"(*a.*) *At the Foremast Head*, a bright white light, so fixed as to show an uniform and unbroken light over an arc of the horizon of 20 points of the compass; so fixed as to throw the light 10 points on each side of the ship, viz., from right ahead to 2 points abaft the beam, on either side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least five miles:

"(*b.*) *On the Starboard Side*, a green light so constructed as to show an uniform and unbroken light over an arc of the horizon of 10 points of the compas; so fixed as to throw the light from right ahead to 2 points abaft the beam on the starboard-side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles:

"(*c.*) *On the Port Side*, a red light, so constructed as to show an uniform and unbroken light over an arc of the horizon of 10 points of the compass; so fixed as to throw the light from right ahead to 2 points abaft the beam on the port-side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles:

"(*d.*) The said green and red side-lights shall be fitted with inboard screens, projecting at least three feet forward from the light, so as to prevent these lights from being seen across the bow."

"Art. 5. Sailing ships under weigh, or being towed, shall carry the same lights as steamships under weigh, with the exception of the white mast-head lights, which they shall never carry.

"Art. 6. Whenever, as in the case of small vessels during bad weather, the green and red lights cannot be fixed, these lights shall be kept on deck, on their respective sides of the vessel, ready for instant exhibition; and shall, on the approach of or to other vessels, be exhibited on their respective sides in sufficient time to prevent collision, in such manner as to make them most visible, and so that the green light shall not be seen on the port-side, nor the red light on the starboard-side.

"To make the use of these portable lights more certain and easy, the lanterns containing them shall each be painted outside with the colour of the light they respectively contain, and shall be provided with suitable screens.

"Art. 7. Ships, whether steamships or sailing ships, when at anchor in roadsteads or fairways shall exhibit, where it can best be seen, but at a height not exceeding twenty feet above the hull, a white light, in a globular lantern of eight inches in diameter, and so constructed as to show a clear uniform and unbroken light visible all round the horizon, and at a distance of at least one mile."

"Art. 9. Open fishing boats and other open boats shall not be required to carry the side-lights required for other vessels; but shall, if they do not carry such lights, carry a lantern having a green slide on the one side and a red slide on the other side; and on the approach of or to other vessels, such lantern shall be exhibited in sufficient time to prevent collision, so that the green light shall not be seen on the port-side, nor the red light on the starboard-side.

"Fishing vessels and open boats when at anchor, or attached to their nets and stationary, shall exhibit a bright white light.

"Fishing vessels and open boats shall, however, not be prevented from using a flare-up in addition, if considered expedient."

If the law, such as it is, were complied with, there might be less difficulty than there is; but the law is not complied with. First, as to trawlers, the Report points out—

"Under the above rules which form the present law—

"(1.) A trawler that is *not* 'stationary' *when her trawl is down*, is required to show her green and red side-lights properly fixed and fitted with screens in their places, unless the vessel is so small and the weather is so bad that she cannot keep them up, and in that case, and during the bad weather, she is to carry them on deck at their proper sides, ready for instant exhibition.

"(2.) When she is at anchor, or when her trawl is down and

she is stationary, she is not now required to show her side-lights; but is to show a bright white light, in an 'all-round' lantern.

"(3.) She may at any time, and whether at anchor or under way, show a flare-up if expedient.

"*Existing Practice.*

"What the fishermen inform us a trawler actually does now, as a rule and in face of the law, is to show when her trawl is down and when she is at work, that is to say, when she is going over the ground at from half a knot to three knots an hour, a bright white light in an 'all-round' lantern. The method of carrying the present illegal light while at work, will be seen on reference to Diagrams numbered 1, 2, and 3 in the Appendix to the Report. This light, as will be seen, is carried at a crane at the fore-mast-head in some cases, and in others at the crosstrees, sometimes on the weather crosstree and sometimes on the lee one; and the vessel sometimes shows a flare-up, but she rarely shows her coloured side-lights. In some exceptional cases, however, we learnt that a trawler has, when at work, shown her side-lights as well as the illegal white masthead light. Thus, when she shows the white light only, she appropriates to herself the light of a ship at anchor, or a stationary ship, or the light of a pilot vessel; and when she shows, in addition to her side-lights, the white masthead or crosstree light, she assumes the distinctive lights of a steamship under way. When her trawl catches in the ground and she in consequence becomes immovable, she displays two white lights. It is not surprising that approaching merchant ships are puzzled: and that collisions occasionally occur.

"At the same time we think that the very fact of the trawlers exhibiting this white light at their masthead shows that they are of opinion that their safety is imperfectly provided for by the side-lights and flare-up light of the existing regulations."

Secondly, with reference to drifters—

"As regards the lights of these vessels there is also at present some confusion and law breaking, which is not altogether unreasonable under the circumstances.

" *Existing Regulations.*

" The existing international regulations require that—

" ' Fishing vessels and open boats when at anchor, or attached to their nets and stationary, shall exhibit a bright white light.

" ' Fishing vessels and open boats shall, however, not be prevented from using a flare-up in addition, if considered expedient.'

" *Existing Practice.*

" The existing practice is not uniform. Until recently many of the drift-net fishing boats, when at work, showed two white lights; at the present time most of those at Penzance and neighbouring ports show, we are informed, one only. The two white lights when shown were generally placed one above the other on a stanchion or upright amidships, about three feet apart. Or, on the East Coast, on a stay from the mizen mast. If one white light is shown, it is generally carried on a stanchion or on an upright in the same way, and is fairly represented by the lower of the two lights in diagram 4; but we do not find that it is ordinarily carried on one of the masts used for the sails. The drift-net boats hailing from the Cornish ports are much smaller than the trawlers, and do not, as a rule, carry their side-lights fixed and in their places, but they carry one lantern having the red and green slide, to exhibit the red or green side-light to approaching ships. They also carry, and when necessary use, the flare-up. The white lights carried by the drifters, when drifting with their nets are often exceedingly powerful lights, and are of use not only to make the presence of the drifter known to other vessels, but to throw light on the deck of the drifter to enable the crew to see to work."

In the event of any collisions between merchant ships and fishing vessels trawling, it is highly important that the master of the merchant ship should in future have the benefit of the statements contained in this Report. It is quite clear that fishing vessels do not comply with the existing law as to side-lights when they are not fishing; while, in the case of trawlers at work, the Report also shows that the law is disregarded. The Report on this point is as follows:—

"We find—

"First that the existing regulations as to lights are, as a general rule, disregarded.

"Secondly, that trawling vessels carry, while at work, a white light which has never been authorised by any regulations whatever; and

"Thirdly, that much confusion must have arisen through the trawlers having thus made a law for themselves outside all authorised regulations.

"Fourthly, that the owners of trawling vessels wish the international regulations to be specially and expressly altered, with a view to enabling their vessels to continue to carry the present (illegal) white light."

In fact, the white light of trawlers is an illegal light; it misleads approaching ships by presenting the light of a vessel at anchor, instead of a vessel proceeding through the water, and so it happens that a merchant ship trying to pass ahead of what appears by its light to be a stationary ship, but which is in reality a ship under way, runs it down. As it has never yet been made clear in Court that this white light is an illegal light, the ship has had to pay; but now that the Report we have referred to has been given to the world, we have no doubt whatever that both the counsel for the master and the Courts will regard these cases from a different point of view.

NOTES ON THE EQUATORIAL CURRENTS OF THE EASTERN PACIFIC.

To the Editor of the "Nautical Magazine."

Stockwell, 3rd March, 1880.

SIR,—The accompanying paper has been sent to me by Mr. James Galbraith for perusal. It shows that some of the currents in the Pacific Ocean are not what they have hitherto been shown to be, and its value to the mariner is very great. I have much pleasure in being permitted to send it to you for insertion in the

Nautical as it is quite worthy of a prominent place in your pages. The announcement it contains is of first-rate importance; whilst the care with which the facts are recorded reflects great credit on the officers of the British Merchant Service.

Faithfully yours,

THOMAS GRAY.

Having been employed during the year 1878 running the s.s. *Peruvia*, 3,445 tons gross (late *Nemesis* of London), between China and Peru, the following narrative will be found to contain my experiences in the Pacific Ocean, with an account of the winds, weather, and currents (particularly the latter), as I found them in my various voyages.

Before leaving London, in October, 1877, I supplied myself with the latest charts, and the best books of directions I could get, and being a complete stranger in Pacific waters, I consulted with several of the captains of the steamers plying betwixt Hong Kong and San Francisco as to the best route to take in crossing to Peru, *viâ* the Sandwich Islands.

With the information gathered from various sources, I made up my mind to proceed to Honolulu on the "Great Circle" track, and after leaving Honolulu to pass out betwixt the islands of Oahu and Morotoi; then steam straight to the eastward, until I could make a fair wind of the north-east trade wind; then get into the Equatorial counter current without loss of time, and, having got nearly to the Galapagos Islands, steer straight for Callao.

Having left Hong Kong on the 13th January, 1878, I came across to Honolulu, arriving there on the 3rd February; after landing passengers, &c., I left again at three p.m. on the 4th, and found, as I cleared the land, a strong breeze from the E.N.E. As we had met with but very light "Trades" approaching the Islands, I fully expected to find the breeze lull down, but in this I was disappointed; as we proceeded to the eastward it increased in force, and hauled to E. by N., and sometimes east. I noticed also that we were getting into a very confused sea, and on working up the position on the 5th found we had had a current setting to the westward about ¾ of a knot per hour.

I determined to try on hoping for better things; but, by 8 a.m. the following day, I had to abandon my attention of getting to the eastward by this route. The wind was steady at east, pressure about 6, with occasional rain squalls, the sea very confused; there was first the sea from the eastward belonging to the wind, then from the N.N.W. came a long deep swell, and occasionally another from the W.N.W. was quite perceptible. The effect of this mixture may be imagined; we would go along steadily for five or ten minutes, and then get suddenly brought up by a slap on the bows, which would make the ship quiver from stem to stern, what with the rolling and pitching, and the speed down to five knots, I kept away to the southward under fore-and-aft canvas, my object now being to make easting as opportunity offered, gain the Equatorial counter current, and proceed according to my first intentions.

As we edged down the "Trades," the wind clung steadily to the east, occasionally drawing a little to the southward, and day by day the current increased till it got to 25m. in the 24h., on the 11th day of February, in lat. 12° 08′ N., long. 137° 37′ W.

For the next two days I had no current. The wind being now from the N.N.E., I hauled away to the eastward, trying for the counter current, but with no success. On the 15th February, our position was 4° 43′ N., 125° 0′ W., and a current to the W.S.W. 30m.! in the 24 hours.

I kept edging along to the eastward, hoping to get a help towards my port, but from the 15th to the 21st inst., when our position was 0° 22′ S., 103° 59′ W., we had a current to the W.S.W. and west, varying from 20 to 30m. a day.

On the 22nd, I found that the current had completely changed its courses, having set N.N.W. 20m. in the last 24 hours. The next day it had resumed its old direction to the west, and then W.N.W., but now diminishing in strength, until on the 26th, in lat. 7° 59′ S., long. 90° 52′ W., we had no current at all. From this into Callao 9m. was the strongest we had in the 24h., until getting into the dirty green water off the coast, where we found a sharp set to the N.W. We anchored in Callao after a passage of 25

days 20 hours from Honolulu, which includes a stoppage of six hours for repairs.

After losing the N.E. trades, we had variable winds with lots of rain, but generally a smooth sea.

We picked the S.E. trades up in 1° south, and I noticed there was a hard patch in them south of the Galapagos Islands, in which the wind kept steady at east and E. by S., with pressure about 5.

The barometer was very regular in its movements; about 10 a.m. it would commence falling, and by 2 p.m. it would be down about $\frac{15}{100}$, then it would begin to rise again to its usual range, 30·10. This went on day after day, with but very slight variation, especially between the latitudes of 10° N. and 10° S.

I found very little difference in the compass deviation between the China Sea and the Sandwich Islands, but on getting to the eastward of the islands I noticed a marked difference both outward and homeward bound. I always work with "Napier's diagrams," and kept two curves, one for the eastern half of the voyage and one for the western.

During our stay in Callao, I thought a good deal over the best route for the homeward passage, and profiting by my outward experiences, I determined to try a straight line for it. My belief in the existence of an equatorial counter current was considerably shaken coming out, and the straight line course would prove whether it had an existence or not.

On the 21st March we finished our lading, and left Callao for Honolulu and Whampoa. By noon we were well clear of the Hormigas-de-Afuera, and by noon next day were 262m. on our journey, with a current to the W.N.W of 14m. Having passed through the patch of no current which I noticed in my outward run, we soon came up with the westerly set again. The wind, I noticed, in these regions, was much stronger from 9 a.m. until 5 p.m. than during the rest of the 24 hours. On the 27th March our position was 3° 36′ S., 102° 22′ W., and the current was 32m. to the westward. Next day, in 2° 16′ S., 106° 13′ W., I found it had dwindled down to 8m. only, while on the next two days I had 23m. and 11m. respectively to the *eastward!*

I edged to the north a little, and had the satisfaction of finding we were again in the westerly current next day, although it only amounted to 5m. for the 24 hours. Our position this day was 2° 49′ N., 116° 35′ W., and from this (the 31st March) until our arrival in Honolulu, on the 10th April, we had a steady current of from 32m. to 15m. to the westward day by day.

This was very satisfactory evidence that the "counter current" does not have an existence in the month of April in the limits assigned to it, either by the Admiralty charts or the Blue chart by Laurie.

With the experience of two passages, it struck me that the equatorial counter current must either change its position with the season of the year, or else was to be found south and not north of the Equator, and as I still thought a good passage might be made to Callao from Honolulu, by the northern route, if the trade wind only kept steady and moderate in force, I determined to give it one more trial on my next voyage.

On the 17th September we again arrived in Honolulu *en route* for Callao, and left on the 18th at 8 p.m.

I steamed away to the eastward, as on my last voyage, and having had a steady, but not very light, trade wind approaching the islands from the westward, I hoped that I should have a continuance of it to the eastward.

I was again disappointed, for hour by hour as we cleared the land the breeze increased steadily in force, and settled down at E. by N.; the same experiences met us, as we went on, that had baulked our outward passage last voyage. I kept on until we reached lat. 22° 21′ N., long. 149° 26′ W., the current had set N. 62° W. 13m. during the last 24 hours, the wind had a hard angry look about it, and the sea was high and confused. I therefore kept away to the southward, braced the yards sharp up, set all sail, and steered "full and bye;" by noon next day we had made 234m., and an exceedingly weatherly course, having only lain up about S. by E. true.

The next day, in about lat. 15° N., we ran out of the trade wind, and steered down S.E.; again we had made such a weatherly course that I had reason to think we had had a little easterly current.

Nothing of much interest occurred until Friday, the 27th September, in lat. 6° 26′ N., long. 135° 50′ W., when we found there were many indications of land about. We passed a piece of wood and many turtles; there were also quite a number of birds around us, mostly of the "boatswain" species, and the water was of a greenish tinge. The runs made in the intervals were almost unaffected by current, and I was congratulating myself on getting so well on our journey.

The next day I was staggered to find we had had a set to the northward in 24h. of 40m.! having set N. 4° W. true. The sea was now a *deep, deep blue*, and the temperature of it was down 2° from yesterday, 79° instead of 81° F. Steady southerly monsoon now, and many "boatswain" and turtle about.

On the 29th the current ran S. 79° W. 25m., temperature of the sea 79°, and inclining to rise.

On the 30th, in lat. 4° 05′ N., long. 125° 9′ W., the current set N. 57° W. 41m., so I altered the course to S. 65° E., to get to the southward out of it. Neither birds nor turtle this day: temperature of sea at 8 p.m. 78°.

On the 1st October, in lat. 2° 30′ N., 123° 05′ W., I found the current had been setting N. 84° W. 79m.!

I was inclined to think some mistake had been made, but as there were three of us navigating, and all by different chronometers, it could hardly be. I streamed a new Patent Log from the opposite side to check the one in use, but found both to agree exactly. Temperature of the sea 77° to 78° F.

A most extraordinary change took place shortly after midnight. At that hour the temperature of the sea was 79°; at about 3 a.m. it grew quite chilly, and a heavy dew began to fall; at 4 a.m. the temperature of the water was 71°; down with a jump from 79°! At daylight the water had changed colour from a *deep bluish black* to a *dark dirty green*. Great numbers of turtle. This day from 8 a.m. till noon 32 were counted from the bridge. At noon we found the current had set west 60m.; at 9 p.m. the temperature of the sea was 72°; and I tried a bucketful over the stern, where it would be agitated by the screw, but found no difference.

October 3rd, lat. 0° 44′ S., long. 118° 28′ W. Calm, beautiful day; long swell from the S.W.; temperature of sea and air alike, 70½°; current, N. 88° W. 81m.; sea of a greenish colour; neither birds nor turtle, but saw several whales; lovely night, foggy horizon, and heavy dew falling.

Next day the current had nearly all vanished, the sea was still green, but the temperature had risen to 72½°; after this the current got gradually less, and changed its direction to the south and west.

October 7th, another change. Lat. 4° 45′ S., long. 107° 17′ W.; the current set N. 86° W. 29m., but the water had changed colour again to a bright beautiful blue, and this day we passed through a colony of crabs. Temperature of sea and air 73°, steady trade wind from E. by S. to E.S.E.

On the 8th, in lat. 5° 46′ S., long. 104° 18′ W., the current finished, setting S. 56° W. 11m., and did not re-appear again to any extent until reaching Callao, but from this the temperature of both sea and air went gradually down, and stood lowest at about 500 miles from port, where both were 64° to 65°. The wind was the same in the hard patch south of the Galapagos as I found it last voyage.

It was only on the morning of the 16th that the green water re-appeared, and that only gave place to the brownish-green usual on the coast close in to the land.

There was not a vestige of current right in to the Hormigas-de-Afuera, and from there to the north end of San Lorenzo Island we had a slight set to the southward.

We anchored in Callao on the 16th October, after a passage of 27 days 8 hours from Honolulu.

After days and weeks of worry and anxiety as to the strange workings of this wonderful current, light began to dawn upon it as we advanced to the eastward, so that before we arrived at Callao my mind was quite at rest on one point, viz., that we had been contending with a mighty river running partially through the Pacific Ocean; that it took its rise somewhere in the vicinity of the Galapagos Islands, and from there flowed westward, until it came in contact with the great body of water moving to the eastward,

known as the Equatorial counter current; but, being unable to cope with that, it struck off at nearly a right angle to the northward across its face, and then, when it got to the north, and the pressure was removed, it got leave to resume its path to the westward, curving gently round.

This theory proved to be a key to the riddle; and, read by the light of our homeward experiences, the following will be found to be a correct explanation of this mid-ocean current.

There is considerable testimony as to the existence of a current setting to the southward and south-east, along the Californian and Mexican coasts (possibly a continuation of the Japanese current). This body of water gets pent up in the Gulf of Panama; it cannot get south on account of Humboldt's current, which is constantly flowing north along the coast of Peru; it follows, then, that these two streams, each striving for the mastery, change their course to the westward, and rushing along side by side near to the equator until they meet the equatorial counter current, which splits them like a wedge. During this long race each stream, although running side by side, has preserved its individuality; the northern one a *deep, deep blue*, with a mean difference of temperature of about 2° to the ordinary waters of the Pacific; the southern one of a *dark, dirty green*, and a temperature which clearly proves it to be of extreme southern origin.

These two then are split assunder by the equatorial counter current, and the blue one is shunted off to the north, until it gets beyond the influence of the counter current, when it gets leave to resume its westerly journey, aided by the N.E. trade winds, while the *green* one, or Humboldt's current, is deflected a little to the southward, and goes on its course alone.

This may be taken as the normal condition of the current, or, more properly speaking, currents.

Now, consider the conditions under which these two currents are fed. Take the month of December for example. It is winter in the northern hemisphere, summer in the southern. The N.E. monsoon is blowing its hardest in the China Sea, blowing the waters out of it, and sending them to the eastward down by the equator, replenishing itself from the northward, and easing the flow

to the eastward, will it not follow that the following will take place?—The southerly and south-easterly set along the North American coast will be eased, the equatorial counter current will be strengthened. Humboldt's *green* current will force the *deep blue* one bodily north of the equator, and the strengthened counter current from it to the eastward, so that it will resemble a shrunken horn, or distorted letter S reversed, the lower end of which is pointing to Panama, and the upper a little to the eastward of the Sandwich Islands.

In the summer the reverse will happen; the augmented waters from the north will force Humboldt's current away south of the equator,—will even wedge itself in betwixt it and the Peruvian coast, and so envelope the land in fogs occasionally; the relaxed counter current will be pushed to the west and south-west, and the large mouth of the horn will be found forcing its waters on, and to the southward of, the Sandwich Islands.

Is not this a satisfactory explanation of the Japanese junk cast on shore on one of the Sandwich Islands after a ten months drift? Suppose that junk blown out of sight of the land; she gets into the "black stream current," is carried by it on the great circle track across the Pacific, until it neared the Californian coast; she would then drift down this and the Mexican coasts until, striking into this new current, she would be borne right on to the Sandwich Islands!

There is plenty of testimony in the books of directions and the charts of a current of more or less strength and regularity, flowing to the south all along the North American coasts, but nothing to prove a current that would drift a log of timber from California to the Sandwich Islands.

By this theory of expansion and contraction of the horn shape of the current, it proves beyond a doubt that when we were steaming through so many turtles, bits of wood, &c., that the *green* current was even then setting to the westward, through the Galapagos Islands!

Having experimented on the chart with a paste-board "horn-shaped" contrivance to represent the current in its various stages, this showed that the current would be met with on the home-

ward voyage near to the equator west of the Galapagos Islands.

On the 4th November, at 8 p.m., we left Callao for Honolulu and Hong Kong, and I kept in well with the coast to get the benefit of any current there might be going to the northward. On the 5th at noon we found ourselves 2m. astern of the Patent Log. Soon after, we ran into light blue water, and day by day found only a moderate current with us. On the 7th the water changed back to green again, and on the 9th we passed through many patches of whale feed, which looked like bucketsfull of blood thrown into the water.

On the 10th it looked as if we were nearing the current for we ran into a thick fog. The moon and stars were distinctly visible overhead, but it was so thick down below that from the bridge you could not see the bow. On the 11th, shortly after noon, we ran from the green water into the *deep, deep blue*, and p.m. sights showed we were now in the current. I kept away west to get the benefit of it, and on the 12th we made the handsome run of 332m.!

The current set N. 80° W., so I followed it, and got 326m. next day. Now I found that the current was bearing more to the north, having set N. 68° W. 62m. for the last 24 hours. I hauled up to N. 68° W. thinking I would be still in time for the *corner*, not knowing it was so near. By noon next day we had made 314m., and found the set had been N. 56° W. 47m.

I had no idea the "horn" or shape of the current had shrunk up so much to the northward and westward since I had experienced it only a few weeks before, but so it was, and almost before we had the position worked up broken water was reported; I ran up on the bridge, and just saw the last of the current speeding away to the north. The sea around us was now a bright blue, and there were great numbers of sea birds chirping about us and great clouds of flying fish, and tide rips as far as the eye could reach to the north and south marking the edge of the current.

The water was very confused and the ship kept just dancing for while; by evening it had smoothed down and we went along h quieter.

The next day we ran into the Doldrums about 9 a.m., and it rained incessantly the whole day. By 1 p.m. we had picked up the N.E. trades, and on the day following (the 16th November) we found, on working up the position, we had barely got what we had logged, and we also noticed a very slight trace of an easterly current for the two days.

From this to Honolulu we had a very fresh trade wind, but only a moderate current, hardly worth mentioning.

We arrived at Honolulu on the 24th November, 1878, at 8 a.m., after a run of 19d. 12h. from Callao, having traversed 5,420m.

I shall conclude with some remarks I wrote in my journal at the time when we had just passed through this current, and I trust they may be found useful to others who, like myself, may be called to navigate in these comparatively unfrequented localities.

It must be remembered that the direction of the "blue" current varies with the season of the year; it will be found at its northernmost limit in December, and at its southernmost in June.

Its colour is a *deep, deep blue*, and cannot be mistaken; the surrounding waters of the North Pacific are a bright beautiful blue, so that you can tell in a minute if you are in it or out of it.

Its waters differ in temperature from that around it by about 2°. We found a uniform temperature of 78° in it, and the hour we passed out of it up went the thermometer 2°. I should think that its breadth when it runs swiftly is about 80 or 100m., and great care is necessary if taking advantage of it not to run out of it, especially at night.

While you are in it you can see nothing in the surroundings which would lead you to believe you were in a current at all, particularly when it is running to the westward. We saw neither birds nor turtle, and only a flying fish very rarely, but what we saw were of great size.

The thermometer is indispensable; it will give the first warning as to getting into or out of it.

Very great care is necessary when approaching the bend or elbow where it turns to the north. It is better to anticipate it than to hang on too long. In the one case you will be in a

position to run into it again with certainty, while in the other you may shoot clean out of it, and find yourself in bright blue water amongst tide rips and birds, as we did a few days ago.

The table given below will show very nearly the course of the current for three periods of the year, so there will be little difficulty in finding or avoiding it all the year round.

APPROXIMATE PATHS OF THE CURRENT IN VARIOUS SEASONS.

End Sept. beginning of Oct.		In December.		In June.	
Lat. 0° 0′	Lng. 85° W.	Lat. 0° 30′ N.	Lng. 85° W.	Lat. 8° 20′ S.	Lng. 85° W
„ 1 0 N.	„ 90 „	„ 2 40 „	„ 90 „	„ 6 10 „	„ 90 „
„ 1 20 „	„ 95 „	„ 2 50 „	„ 95 „	„ 5 30 „	„ 95 „
„ 0 50 „	„ 100 „	„ 2 30 „	„ 100 „	„ 6 20 „	„ 100 „
„ 0 30 „	„ 105 „	„ 2 10 „	„ 105 „	„ 7 30 „	„ 105 „
„ 0 00 „	„ 110 „	„ 3 50 „	„ 110 „	„ 7 15 „	„ 110 „
„ 0 35 S.	„ 115 „	„ 10 0 „	„ 115 „	„ 7 15 „	„ 115 „
„ 0 15 „	„ 120 „	„ 15 30 „	„ 120 „	„ 6 00 „	„ 120 „
„ 1 30 N.	„ 125 „	„ 19 00 „	„ 125 „	„ 4 20 „	„ 125 „
„ 4 50 „	„ 130 „	„ 21 00 „	„ 130 „	„ 1 20 „	„ 130 „
„ 6 00 „	„ 132 „	„ 22 00 „	„ 135 „	„ 5 00 N.	„ 134 „
„ 12 40 „	„ 135 „	„ 21 00 „	„ 140 „	„ 10 00 „	„ 134 „
„ 21 40 „	„ 145 „			„ 12 00 „	„ 140 „
				„ 14 00 „	„ 145 „
				„ 15 00 „	„ 150 „

The steamboat passage will certainly be made from Honolulu to Callao by coming down the trades "full and bye" direct with the "doldrums," then steam to the east, and cut the current, continue on till near the Galapagos, then cut it again and head strait for port.

Care must be taken to keep a reasonable distance from the path of the current, and so keep out of its influence.

For the homeward run, watch the thermometer and keep in the current.

JOHN McKIRDY.

MONTREAL SYSTEM OF LOADING GRAIN FOR SHIPMENT TO TRANS-ATLANTIC PORTS.

[The following important communication has reached us through our Canadian correspondent, and we commend it to the careful consideration of all those who are interested in the subject of grain cargoes and grain-carrying ships, more particularly of those who think that grain should never be carried in bulk. The North American Lakes and the St. Lawrence River are now (and in the future will be still more so) great highways for the carriage of the corn raised in the rapidly developing districts of the North-West, and it is most satisfactory to find that at the chief fresh-water port of the St. Lawrence, so much care and judgment are exercised in regard to this matter.—Ed. *N. M.*]

"Montreal, 17*th February*, 1880.

"F. W. Henshaw, Esq.,

"*President, Montreal Board of Trade.*

"Dear Sir,—In compliance with the request of the Council, I have bestowed considerable care upon some tabulated statements relating to the shipment of grain from this port, since the year 1872, covering a period of eight years. They are appended hereto. The inquiry into which I have been led, has opened up a question—or rather, I might say, *solved* it—of much importance to the trade of the River St. Lawrence, viz., the best method for stowing the cargoes of grain-carrying trans-Atlantic vessels; and for the sake of simplifying reference to these Statements, I take the liberty of making a few explanations.

"Statement **A** gives the particulars concerning six grain-laden steamships which sailed from Montreal during the fall of 1872, and were reported as 'foundered' or 'missing'—as noted in the 'remarks' column. Statement **B** relates to eight grain-laden sailing vessels which left this port in the summer and fall of 1872,—the reports being 'foundered,' 'abandoned,' or 'missing.'

"The aggregate quantity of grain destroyed by the loss of the six steamships was 299,936 bushels—including 147,496 bushels wheat, and 152,440 bushels corn. The eight sailing vessels

carried 213,772 bushels of grain, viz., wheat, 48,256 bushels; corn, 156,921 bushels; peas, 8,595 bushels. Total loss of grain in fourteen vessels, 513,738 bushels. The total number of grain-laden vessels which, according to our records at the Port Warden's Office, sailed from Montreal in 1872, was 338, aggregating 309,131 tons; the percentage of vessels lost was, therefore, 4·14, and of tonnage 3·40.

"Up to, and includiug 1872 (the year to which Statements A and B relate), the rule that provided for the proper loading of vessels with grain could be evaded—its violation only involving a fine of $40. In that year, the grain-laden vessels included 157 steamships, and 181 sailing vessels. The masters of 51 steamers and 7 sailing vessels, paid the fine of $40 each for breaking the loading rule, all the vessels named in Statements A and B being on that list of violators. Before the opening of navigation in 1873, after careful investigation a code of revised rules was sanctioned—the regulation for loading grain was made more stringent. Martell's rules for freeboard were adopted, and the penalty for infraction was raised to $800—the Customs' authorities being also authorised to withhold the ship's clearance until the master obtained the Port Warden's certificate. The beneficial results of this action on the part of the Council, were soon apparent; from 1873 to 1879, both inclusive, the number of grain-laden sea-going vessels that cleared from Montreal was 2,180; steamships, 1,074, and sailing vessels, 1,113. The following is a summary:—

	Steamships.	Sailing Vessels.	Totals.
1873	147	174	321
1874	116	143	259
1875	116	219	335
1876	143	152	295
1877	165	123	288
1878	165	142	307
1879	224	160	384
Totals	1,076	1,113	2,189

"Of all the vessels, during that period, only fifteen (15) were wrecked, viz., 8 steamships and 7 sailing vessels, or 0·68 per

cent.; while 5 steamships were damaged by stranding or collision. NOT A SINGLE ACCIDENT OR LOSS OCCURRED DURING ALL THAT TIME, IN CONSEQUENCE OF A VESSEL BEING GRAIN-LADEN. The particulars of all the wreck and damage that *did* occur, are given in the Statements C, D and E. Regarding the barque *Templar*, mentioned in Statement E, it may be remarked that there was some question, at the time, as to the stowage of her cargo. When taken into Halifax, however, and unloaded for repairs, it was ascertained that the bulk-grain had not shifted—only about 1000 bushels having been damaged by water shipped when on her beam ends in a storm.

"A recapitulation of the changes of regulations in the Port Warden's Office here, would show that the results were exactly such as the COUNCIL and Examiners contemplated. For example, from 1873 two of the loading rules were :—

"'*Rule* 13. The following scale is the limit to which ships of ordinary build should be laden, subject, however, in all cases, to the judgment of the Port Warden :—

Vessels from	12 to 14 ft.	depth of hold	to	have	$2\frac{1}{2}$	inches
„ „	12 to 17	„	„	„	$2\frac{3}{4}$	clear side
„ „	17 to 20	„	„	„	3	to each
„ „	20 to 22	„	„	„	$3\frac{1}{4}$	foot depth
„ „	22 to 26	„	„	„	$3\frac{1}{2}$	of hold.'

"'*Rule* 21. The master of any vessel wholly or partly laden with grain for any port not within the limits of inland navigation, shall, before proceeding on his voyage, or clearing at the Custom House for the same, notify the Port Warden, whose duty it shall then be to proceed on board such vessel and examine whether she is in a fit state to proceed to sea or not; if she is found unfit, the Port Warden shall state in what particular, and on what conditions only she will be deemed in a fit state to leave, and shall notify the master not to leave the port until the required conditions have been fulfilled; and in case of the master refusing or neglecting to fulfil the same, the Port Warden shall notify the Collector of Customs, in order that no clearance may be granted for the vessel until such required conditions have been fulfilled, and a certificate thereof granted by the Port Warden or his Deputy.'

"The practice for loading grain under the revised rules, since

opening of navigation 1878, say, for a water-ballast steamer of 1,270 tons net register, would be as follows :—Dimensions 286 ft. × 35 ft. × 24 ft.—two decks, three tier of beams, and classed 100 A1 English Lloyd's; loading under the rules, for a fall voyage. The shifting-boards to extend from the deck to the top of the water-ballast tank, or the keelson ; bulk grain is run into the hold to within three or four feet of the middle deck ; the bulk grain is then closely platformed over with inch boards, and grain in bags placed on top to prevent it from shifting. In the 'tween-decks, shifting-boards are fitted, and the grain has to be stowed in bags, none in bulk being allowed. The cargo would be about 85,000 bushels of wheat, and the free-board 6 ft. 5 in. in salt water.

"Masters of vessels often make complaints against the Montreal Port rules, declaring that they are permitted to load more grain in Black Sea and United States than here, and without restriction as to grain in bags. This is quite likely, in view of the exhibit in Statement F, showing vessels abandoned and missing within a period of about nine months—doubtless many from over-loading and bad stowage. The first vessel on the list of those 'abandoned,' seems to prove this. Here are the facts. I am told that the S.S. *Yoxford*, 1,301 tons net register, from New York to Havre, was abandoned on 12th September, 1878—her cargo consisting of (according to the New York *Journal of Commerce*) 97,235 bushels of wheat, which is equal to 2,600 tons dead weight! Of the 44 vessels particularised in the Statement F, 20 sailed from New York, 14 from Baltimore, 4 from Philadelphia, 2 from Boston, 2 from New Orleans, 1 from Portland, and 1 from Norfolk. The loss of grain by them, was about 1,800,000 bushels. The loss of life by the 5 steamers and 21 sailing vessels which were never heard from, was about 450 persons.

"It is worth while, in view of the results shown in the several statements, to refer to Mr. Pimsoll's contemplated agitation in the Imperial Parliament, as recently foreshadowed by the London *Times*, in a paragraph which was copied by newspapers in Canada, as follows :—

"'In consequence of the great loss of Atlantic cargo steamers

within the past three months, through cargoes of wheat in bulk shifting and causing them to capsize and founder, there is not only an extensive movement in the north of England on the part of shipmasters, but also among iron steamship owners themselves, who are their own underwriters, to put an end to the mischief. Mr. W. Dickenson, of the Quayside, Newcastle, an extensive iron shipowner, has got the support of a large number of owners, and at the next annual meeting of the Marine Association to be held February 20th, a resolution will be submitted that a By-Law be passed to compel all grain shipments to be made in bags, to prevent shifting their cargoes at sea. The cost of bags would be trifling. They could be sold at nearly cost price in England, or they might be reserved for future voyages. The weight of those bags would be very little, not much more than that of the modern shifting-boards now in use, and which have proved quite insufficient to keep cargoes steady.'

"It is of some importance, in the discussion which seems to be at hand, to know that the parties who now so loudly protest against cargoes of bulk-grain, are those who, in 1873, declaimed with so much vigour in favour of grain cargoes being all in bulk. Instead of the cost of bags being but trifling, the extra expense of bagging for trans-Atlantic shipment would probably add 3c. or 4c. per 100 lbs. to the cost of the grain carried from Montreal during the season of navigation, or would have enhanced the price of the total shipments of grain by the River St. Lawrence in 1879 to the extent of nearly $200,000. Most people would be apt to think, that such a tax would be too much to impose unnecessarily upon breadstuffs, at the whim of a few owners and masters of iron steamers, which, it is alleged, have not always had a high character for seaworthiness.

"Capt. Geo. W. Morrison, Marine Insurance Inspector of this City, has written, in answer to a letter from Lloyd's Surveyor, at Quebec, as follows:—'It is absolutely necessary to make compulsory rules; and I am satisfied that, if the Montreal Port Warden's Regulations as to grain-loading, *strictly enforced*, were universally adopted—(with the following addition, viz., that during the winter months vessels should not carry more than their

register tonnage of grain in bulk and the balance in bags—the free-board to be taken from Mr. Martell's Tables, *without any abatement*)—it would soon put a stop to the wholesale loss of seamen's lives and steamers, which has been going on for the last few years.'

"Capt. D. Ross Kerr, the Port Warden, an experienced ship-master, says:—'Mr. Dickenson's resolution, it strikes me, does not propose the proper remedy, because my own experience has shown me that shifting-boards cannot be dispensed with in a ship loaded entirely with bags; and I maintain that a ship loaded according to our rules, with, say, about two-thirds in bulk, and one-third in bags, is as safe as if she were all laden with bags—*and a great deal safer than if she were laden with bags without shifting-boards*.'

"Only a few words more in conclusion. It appears to me to be established by the particulars in this communication, that the method of loading pursued in the Port of Montreal, under the control of your Council, is clearly in the interest of the grain-trade—is undoubtedly favourable for underwriters, the one that best conserves life and property, and that it should, therefore, be pressed for adoption at all grain-loading seaports. At any rate, whatever legislation Mr. Plimsoll may be able to obtain in the Imperial Parliament MUST NOT BE APPLICABLE TO GRAIN-LADEN VESSELS FROM THE ST. LAWRENCE; for, I need not remind you that, in remodelling the rules seven years ago, the securing of immunity from loss of valuable lives and destruction of property, were quite as much matters for serious reflection, as the important one of how best to provide for the efficient stowage of cargo. Whatever further safeguards may be adopted, the immediate results, as herein demonstrated, cannot fail to be gratifying. If, on consideration, this view is concurred in, this important subject should be pressed upon the attention of the Dominion Cabinet, with a view to representations being made to the Home Government, so as to prevent the infliction of grievous injury upon the shipping and commercial interests of Canada.

"I am, dear Sir, your obedient servant,

"W. J. PATTERSON, *Secretary*."

STATEMENT A.

List of certain Grain-Laden Steamships Lost on passage from Montreal to Europe in 1872.

Tons	Name.	Master.	Destination.	Date of Sailing.	Cargo.	Remarks.
1055	S.S. *George Cairns* ...	Dickens ...	Limerick	Sept. 27......	Corn, 58,000 bus.	Foundered off Sydney, C.B., October 6th, eight men lost.
815	S.S. *James Maychurch*	Deacon ...	Cork, f.o.... ...	Oct. 12......	Corn, 41,485 bus.	Missing.
1239	S.S. *Shannon*	Moore ...	London	Oct. 31......	Wheat, 46,460 bus.	Missing.
859	S.S. *Gravina*	Olivares...	Dublin	Nov. 1......	Wheat, 35,476 bus	Foundered November 8.
1063	S.S. *Commander* ...	Chambers	Cork, f.o.... ...	Nov. 2......	Corn, 52,955 bus.	Missing.
1450	S.S. *Devon*...	Heather...	Cork, f.o.... ...	Nov. 2......	Wheat, 65,560 bus.	Missing.

STATEMENT B.

List of certain Grain-Laden Sailing Vessels Lost on passage from Montreal to Europe in 1872.

Tons	Name.	Master.	Destination.	Date of Sailing.	Cargo.	Remarks.
456	Bk. *Lady Love*	Longe ...	Queenstown, f.o.	June 27......	Corn, 29,277 bus.	Foundered, crew saved.
629	Bk. *Abergeldee*	Bruce ...	Glasgow	Nov. 9......	Corn, 17,667 bus. Peas, 8,595 bus.	Abandoned and foundered.
500	Bk. *Lake Constance* ...	Oliver ...	London	Oct. 31......	Wheat, 28,016 bus.	Foundered, one man lost.
429	Bk. *Barbadoes*	James ...	Glasgow	Oct. 23......	Corn, 21,000 bus.	Missing.
637	Bk. *Strathavon*	Doquette .	Glasgow	Nov. 9......	Corn, 38,000 bus.	Missing.
386	Bk. *Garibaldi*	Louson ...	Queenstown, f.o.	Sept. 26......	Corn, 25,394 bus.	Missing.
674	Bk. *Lochiel*	Andrews .	Liverpool... ...	Oct. 31......	Corn, 25,583 bus.	Missing.
343	Bk. *Deodara*	White ...	Queenstown, f.o.	Oct. 31......	Wheat, 20,240 bus.	Missing.

STATEMENT C.

List of Steamships Wrecked on passage from Montreal to Europe, from 1873 *to* 1879.

Tons	Name.	Master.	Destination.	Date of Wreck.	Cargo.	Remarks.
1461	S.S. *Medway*	Harris ...	London	Sept. 1873	Wheat, 51,489 bus. &c.	Wrecked on Point Qurolle, Straits of Belle Isle. Total loss.
1598	S.S. *Vicksburg*	Bennett...	Liverpool... ...	June 2, 1875	Wheat, 52,467 bus. Peas, 10,945 bus.	Foundered after *colliding with Ice* on the Banks of Nfd. Total loss.
799	S.S. *Strathtay*	Walsh ...	London	June 21, 1875	Wheat, 31,969 bus. &c.	Wrecked on the N.W. reef of Bic Island. Total loss.
798	S.S. *Rowland*	Swaffin ...	Queenstown, f.o.	Sept. 11, 1877	Wheat, 58,559 bus.	Wrecked on Holyrood Beach, Nfld. Total loss.
1013	S.S. *Strathtay*	Small ...	Aberdeen ...	Nov. 12, 1877	Wheat, 20,097 bus. Corn, 16,159 bus. &c.	Wrecked on the Island of St. Pierre, Nfld. Total loss.
1446	S.S. *Lake Megantic* ...	Battersby	Liverpool... ...	July 22, 1878	Wheat, 25,845 bus. Corn, 18,169 bus. &c.	Wrecked on the Island of Anticosti. Total loss.
1152	S.S. *Burgos*	Martin ...	London	July 18, 1879	Wheat, 43,086 bus. Peas, 5,188 bus.	Wrecked in St. Mary's Bay, Nfld. Total loss.
1317	S.S. *Eirene*	Rollo ...	Glasgow	Oct. 3, 1879	Wheat, 18,605 bus. Peas, 6,000 bus. &c.	Wrecked in Red Bay, Straits of Belle Isle. Total loss.

STATEMENT D.

List of Steamers Damaged by Stranding or Collision on passage from Montreal to Europe from 1878 to 1879.

Tons	Name.	Master.	Destination.	Date of Wreck.	Cargo.	Remarks.
1531	S.S. *Canadian*	McLean	Liverpool ...	Sept. 18, 1876	Wheat, 50000 bs. &c	Stranded on Larne Point, vessel and cargo
1187	S.S. *Langshaw*	Bain ...	London	Aug. 15, 1876	Wheat, 38,314 bus. Oats, 64,148 bus.	Vessel and cargo damaged by collision with Barque, *Eliza Keith*, in R. St. Lawrence.
922	S.S. *Redewater*	Richards	Liverpool ...	July 4, 1877	Corn, 64,427 bus.	Vessel and cargo damaged by collision with the S.S. *Elphinstone*, in R. St. Lawrence.
1269	S.S. *Vindolana*... ...	Gillan ...	Havre	Sept. 16, 1878	Wheat, 85,591 bus.	Stranded and sunk in the Traverse, R. St. Lawrence. Vessel afterwards lifted and repaired, cargo total loss.
1065	S.S. *Fitzroy*	Gibbs ...	London	Nov. 26, 1879	Wheat, 29,626 bus. Corn, 12,000 bus. Peas, 10,287 bus. Oats, 19,888 bus. Barley, 5,444 bs. &c	Vessel and cargo badly damaged by collision with S.S. *Mercutio* in R. Thames, England.

STATEMENT E.

List of Sailing Vessels from Montreal to Europe, Wrecked from 1873 *to* 1879.

Tons	Name.	Master.	Destination.	Date of Wreck.	Cargo.	Remarks.
807	Bk. *British Standard*	Staines	London	Nov. 5 1874	Peas, 14,750 bus. Flour, 936 brls.	Wrecked on Newfoundland. Total loss. [Total loss.
157	Sch. *James Seed* ...	Thomas	Swansea	Aug. 12 1874	Copper Ore.	Sunk by S.S. *Norma* in Gulf St. Lawrence.
285	Brig *Henrys*	Gibb ...	Queenstown ...	June 25 1875	Wheat, 17,563 bus.	Wrecked on Green Island. Total loss.
778	Bk. *Templar*... ...	Trefrey	Queenstown ...	Sept. 9 1876	Corn, 43,713 bus.	Thrown on beam ends and dismasted; towed into Halifax and repaired. [loss.
600	Bk. *Northumbria* ...	Nicholson	Liverpool ...	Nov. 6 1877	Wheat, 31,885 bus.	Wrecked on the Island of Anticosti. Total
506	Bk. *Amicus*	Wright	Queenstown ...	Oct. 26 1877	Wheat, 27,434 bus.	Collided with S.S. *Gamma* in Quebec harbour. Total loss. [rence. Total loss.
434	Bk. *Nereo O*	Ossoinack	Queenstown ...	Oct. 31 1879	Wheat, 23,500 bus.	Wrecked at Grand Vallee, Gulf St. Law-

STATEMENT F.

List of Grain-Laden Vessels from United States Ports Abandoned and Missing from 1*st September*, 1878, *to* 11*th June*, 1879.

Nationality.	Rig.	Name.	Nature of Loss.	Date of Loss.	From.
British	Steamship	*Yoxford*	Abandoned	Sept. 12, 1878	New York.
,, ...	Ship	*Thos. E. Kenny*	,,	Jan. 19, 1879	,,
,, ...	Bark	*Hertha*	,,	Dec. 30, 1878	,,
Norwegian...	,, ...	*Peter Anker*	,,	Nov. ,,	,,
British	,, ...	*Luedna Durkee*	,,	Dec. 31, ,,	,,
,, ...	,, ...	*Lalia W*	,,	May 1879	,,
,, ...	Brig	*La Plata*	,,	Dec. 31, 1878	,,
,, ...	Steamship	*Aberfeldy*	,,	Feb. 24, 1879	Philadelphia.
,, ...	Ship	*Andrew Lovitt*	,,	Jan. 25, ,,	Baltimore.
Norwegian...	Bark	*King Harold*	,,	Feb. 22, ,,	,,
British	,, ...	*Ysusquisa*	,,	Feb. 22, ,,	,,
Austrian ...	,, ...	*Hunnees*	,,	April ,,	,,
Italian	,, ...	*Guisippina Accame*	,,	Jan. ,,	,,
British	,, ...	*Curlew*	,,	Jan. 9, ,,	,,
,, ...	,, ...	*Chili*	,,	Jan. ,,	,,
,, ...	,, ...	*Viking*	,,	Feb. ,,	Norfolk.
,, ...	Steamship	*Bayard*	,,	Dec. 10, 1878	New Orleans.
American ...	Bark	*Fanny J. McLennan*	,,	Nov. 22, ,,	,,

Nationality.	Rig.	Name.	Nature of Loss.	Date of Sailing.	From.
British	Ship	*Lake Michigan*	Missing ...	Feb. 4, 1879	Portland.
,, ...	Steamship	*Homer*	,,	Dec. 17, 1878	Boston.
,, ...	Brig	*C. R. Burgess*	,,	Dec. ,,	,,
German ...	Steamship	*Herman Ludwig*	,,	Sept. 28, ,,	New York.
British	,,	*Bemina*	,,	Mar. 8, 1879	,,
,, ...	,,	*Zanzibar*	,,	Jan. 11, ,,	,,
,, ...	,,	*Surbiton*	,,	Feb. 18, ,,	,,
Italian	Ship	*Nuova Rattler*	,,	Oct. 11, 1878	,,
British	,, ...	*D. R. Eaton*	,,	Dec. 11, ,,	,,
American ...	Bark	*Teikalet*	,,	Sept. 9, ,,	,,
Norwegian...	,, ...	*Tyrus*	,,	,,	,,
American ...	,, ...	*Kalalis*	,,	Oct. 2, ,,	,,
Italian	,, ...	*Ervoe*	,,	Oct. 26, ,,	,,
,, ...	,, ...	*Giusippina Cocunillo*	,,	,,	,,
Austrian ...	,, ...	*Proserpina*	,,	Oct. 5, ,,	,,
British	,, ...	*Rockwood*	,,	Dec. 18, ,,	,,
Austrian ...	,, ...	*Reuben S*	,,	Sept. 21, ,,	Philadelphia.
Italian	,, ...	*Maddelina Prima* ...	,,	Sept. 27, ,,	,,
British	,, ...	*N. Churchill*	,,	Jan. 30, 1879	,,
,, ...	,, ...	*Sunlight*	,,	Sept. 23, 1878	Baltimore.
Spanish ...	,, ...	*Rivadeo*	,,	Oct. 2, ,,	,,
Norwegian...	,, ...	*Ymer*	,,	Oct. 19, ,,	,,
,, ...	,, ...	*Progress*	,,	,,	,,
[illegible]ish	,, ...	*Vigilant*	,,	Oct. 4, ,,	,,
......	,, ...	*Coila*	,,	Feb. 15, 1879	,,
......	,, ...	*Ribble*	,,	Feb. 5, ,,	,,

APPARENT AND TRUE DIRECTION OF THE WIND WHEN SAILING.

QUESTIONS relating to the apparent and true direction of the wind under different velocities of ship and wind, and under different relations of the one to the other, are often referred to us; we trust that the following explanation and Table will be useful for the purpose intended, and sufficiently illustrate the subject.

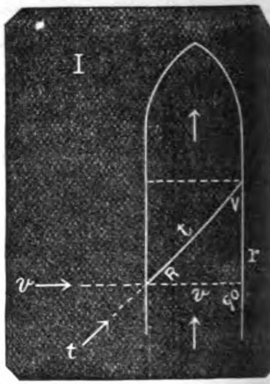
The question appertains to the composition and resolution of forces.

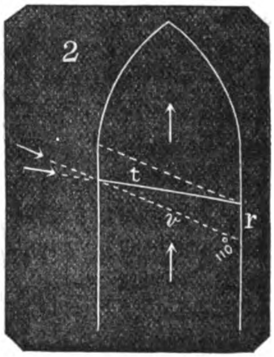
In a *dead calm*, the forward progression of a steamer will *appear to make a wind* coming from right ahead equal to her rate through the water; hence, if she is steaming 10 knots an hour, there will appear, to a person on board, a head wind blowing 10 miles per hour in a direction opposite to the course.

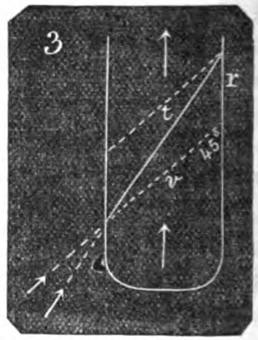
With the *wind right aft*, the problem presents itself under three forms—(1) The velocity of the wind may considerably and palpably exceed the rate of the vessel's progression; hence, if a vessel is making eight knots per hour, and the apparent velocity of the wind is 20 miles, then (the velocity *plus* the rate) $20+8=28$ miles, which is the true velocity of the wind per hour; this case appertains to a sailing ship no less than to a steamer. (2) A steamer's speed may outstrip the wind's velocity, and there may appear to be a head wind; in this case, the steaming rate (say 12 knots) less the apparent velocity of wind (say 3 miles) as a head wind gives (9 miles) the true velocity of the wind in the direction of the course. (3) The steamer's rate and the wind's velocity may be equal, say each ten miles, then there will be neither lagging nor outstriping, but an apparent calm on board. Probably none of these conditions is ever exactly fulfilled.

With the *wind right ahead*, as it may be in the case of a steamer, the apparent exceeds the true velocity of the wind by the steaming rate; hence, if the apparent velocity of wind be 25 miles per hour, and the steaming rate 9 miles, the true velocity of wind is only $25-9=16$ miles per hour.

But the *wind* will generally be *inclined to the ship's course*, and then, to an observer on board, the apparent direction of the wind will always be different from its true direction; it will appear to be more forward than it actually is, and this will be the case whether the wind be abeam (Fig. 1), before the beam (Fig. 2), or abaft the beam (Fig. 3).







For the solution of the problem as to the true direction and velocity of the wind, we have *r* the ship's *rate* or speed through the water, and *v* the apparent *velocity* of the wind. We have also the angle that the apparent direction of the wind makes to the *course* of the ship *reckoned from aft, forward*; thus, with the wind apparently abeam, the apparent direction of the wind to the course will be 90°; with the wind apparently 20° before the beam its apparent direction to the course will be 110°; and with the wind four points on the quarter it will make an angle of 45° to the course.

Knowing the angle that the apparent direction of the wind makes to the ship's course, we also know the sum of the angles V and R, which are respectively opposite to the sides *v* and *r*; the angle V will be the true direction of the wind to the course, and the angle R will be the divergence of the apparent from the true direction.

Now, the sum of the two sides of a triangle is to their difference, as the tangent of half the sum of their opposite angles is to the tangent of half their difference.

V + R the sum of the angles opposite to v and r must be the apparent direction of the wind to the course reckoned from aft; and hence, generally,

$$v + r : v - r :: \tan \tfrac{1}{2} (V + R) : \tan \tfrac{1}{2} (V - R);$$

knowing $\frac{1}{2}$ (V + R), and having determined $\frac{1}{2}$ (V − R), the sum of the half sum and half difference gives the angle V, as the true direction of the wind to the course; and the difference of the half sum and half difference gives R the divergence of the apparent and true winds, that is the angle by which the apparent is more forward than the true wind. This is when the wind velocity is greater than the ship's rate; should it be otherwise, we have

$$r + v : r - v :: \tan \tfrac{1}{2} (R + V) : \tan \tfrac{1}{2} (R - V)$$

On the basis of these formulæ the annexed table has been computed.

The *true velocity of the wind* may also be ascertained, since the sides of a triangle are to one another as the sines of the opposite angles; hence,

$$t : v :: \sin T : \sin V \quad ; \text{or } t : r :: \sin T : \sin R$$

in which the angle T (opposite to t) is known, since V and R are known; and the solution gives t, the wind's true velocity.

On constructing a figure, or referring to the Table, it will be seen that—

1. When the true direction and velocity of the wind remain unchanged, and the ship's course is also unchanged, then the apparent direction of the wind will vary as the ship sails faster or slower. The divergence of the apparent from the true direction increases as the ship's rate increases, and decreases as the rate decreases.

2. When the ship maintains the same rate under winds of different velocities, but inclined at the same angle to the course, the divergence of the apparent from the true direction of the wind will be greater as the wind is slower, and less as it is faster.

The Table sufficiently explains itself.

Apparent velocity of Wind, in Miles, per Hour.	Vessel's (Rate) Speed, in Miles, per Hour.	When the APPARENT DIRECTION of the WIND is							
		2 Points on the Quarter or 22½° to the Course	4 Points on the Quarter or 45° to the Course	10° *abaft* the Beam or 80° to the Course	A-Beam or 90° to the Course	10° *before* the Beam or 100° to the Course	20° *before* the Beam or 110° to the Course	30° *before* the Beam or 120° to the Course	40° *before* the Beam or 130° to the Course
		The TRUE DIRECTION of the WIND to the Course is							
		°	°	°	°	°	°	°	°
5	2	16·1	32·6	59·8	68·2	77·1	86·5	96·6	107·6
	4	12·5	25·1	45·3	51·3	57·5	64·0	70·9	78·4
	6	10·2	20·3	35·6	39·8	43·8	47·6	51·1	54·0
	8	8·6	17·0	29·0	32·0	34·6	36·8	38·2	38·7
	10	7·5	14·6	24·4	26·6	28·3	29·5	30·0	29·4
	12	6·5	12·8	20·2	22·6	23·9	24·5	24·5	23·6
10	4	16·1	32·6	59·8	68·2	77·1	86·5	96·6	107·6
	6	14·1	28·4	51·8	59·0	66·6	74·7	83·4	93·2
	8	12·5	25·1	45·3	51·3	57·5	64·0	70·9	78·4
	10	11·2	22·5	40·0	45·0	50·0	55·0	60·0	65·0
	12	11·1	20·3	35·6	39·8	43·8	47·6	51·3	54·0
20	4	18·8	37·9	69·2	78·7	88·5	98·6	109·1	120·0
	6	17·4	35·1	64·3	73·3	82·7	92·6	103·0	114·1
	8	16·1	32·6	59·8	68·2	77·7	86·5	96·6	107·6
	10	15·0	30·4	55·6	63·4	71·7	80·5	90·0	100·6
	12	14·1	28·4	51·8	59·0	66·6	74·6	83·4	93·2
30	4	19·9	40·1	72·7	82·4	92·3	102·5	112·9	123·6
	6	18·8	37·9	69·2	78·7	88·5	98·6	109·1	120·0
	8	17·8	36·0	65·9	75·1	84·6	94·6	105·1	116·1
	10	16·9	34·2	62·8	71·6	80·8	90·5	100·9	112·0
	12	16·1	32·6	59·8	68·2	77·1	86·5	96·6	107·6
40	4	20·5	41·2	74·5	84·3	94·3	104·5	114·8	125·3
	6	19·6	39·5	71·8	81·5	91·4	101·5	112·0	122·7
	8	18·8	37·9	69·2	78·7	88·5	98·6	109·1	120·0
	10	18·1	36·5	66·7	76·0	85·6	95·6	106·1	117·1
	12	17·4	35·1	64·3	73·3	82·7	92·6	103·0	114·1
50	4	20·9	41·9	75·6	85·4	95·5	105·6	115·9	126·3
	6	20·1	40·5	73·4	83·2	93·1	103·3	113·7	124·3
	8	19·4	39·2	71·3	80·9	90·8	101·0	111·4	122·2
	10	18·8	37·9	69·2	78·7	88·5	98·6	109·1	120·0
	12	18·0	36·7	67·2	76·5	86·1	96·2	106·7	117·7

GRAIN AND COAL CARGOES.

"EX LUCE LUCELLUM."

Was it guile, or a dream?
Do I wonder and doubt?
Are things what they seem?
Or is visions about?
Is our civilisation a failure?
Or is the Caucasian played out?—BRET HARTE.

THE recent losses of new, or comparatively new, iron steamships, laden with coal or grain, has called very serious attention to many facts connected with their proportions, construction, fitting, and loading. But the most startling fact of all in connection with the subject is that the great majority of them were new steamships of a special class, built under a special rule, and classed as 100 A1; that is to say, they go over the seas (or rather did go until they disappeared) bearing the imprimatur of the highest and best classification society in existence, as evidence that they were fit to carry any and every description of * perishable cargo from and to all parts of the world. The fact that so great a number have disappeared, after being so guaranteed, may, we think, be legitimately called a startling fact. The majority of these ships possessed in common certain marked characteristics, viz., narrowness, depth, length, water-ballast tanks or double bottoms, square midship sections, low freeboards, two decks and three tiers of beams, small crews, bulk cargoes. The reason why they had bulk cargoes is plain; the reason why they had comparatively small crews is plain; but the reason why so many of them should have possessed the other characteristics to which we have referred is not at first sight plain. That the majority of them were strong "girders," or strong oblong boxes is evident, and the cause of their disappearance is clearly not to be sought in any element of structural weakness of the hull.

*It may be that coal not being a "perishable" cargo they were not classed to carry coal.—ED. *N.M.*

In one or two cases the skylight arrangements were perhaps flimsy, and may have helped the loss; but this is not at all a common characteristic running through the series. Just as some years ago there was a class called "awning-deck" steamers, now, we think, going out of use; so at the present moment there is a fashionable type of steamships in which the register societies have enumerated the majority of those recently missing with bulk cargoes. Looking round with a view to finding some cause for the present fashion, it is possible that it may be found in the encouragement given to the development of depth over other proportions by the special Rule 41 and Table G of the Committee of Lloyd's Register. In the same way and to the same extent that a set of ships, including many which were exceedingly dangerous when laden down with a full cargo, was called into existence some years ago as awning-decked ships; so now it is abundantly clear that a class of so-called "three-decked" ships, including many exceedingly dangerous, when not loaded with care, has sprung into existence. Ships exceedingly strong as girders, but exceedingly ugly as parallelopipedons; safe enough when properly loaded and with ample clear side, but veritable coffins with four feet or less clear side, when carrying certain cargoes, raised on the platform composed of empty air spaces at the bottom of the ship.

How has this state of things, culminating in these dangers, come about, and how is it to be remedied? To these pertinent questions Mr. Benjamin Martell, the chief surveyor of Lloyd's Register, has found an answer, to his mind, satisfactory: "It is the fault of the tonnage laws," Mr. Martell assures us. "Alter the tonnage laws so as to exempt a good deal more of a steamship from tonnage measurement, and," he comforts us, "the evil is cured." The completeness of this suggestion, as combining at once a statement of the cause of the creation of structures which, when badly loaded, are fraught with danger, and of the cure, is so sweetly innocent and simple that we cannot pass it over, even if we would. First, however, we must place Mr. Martell on our own side as a witness to the alarming magnitude of the danger under certain known conditions, of certain ships, built under Rule 41 and

Table G. In making our remarks, we wish to be understood that we can find no fault with those who administer the classification rules; those officers are as desirous as any of us to contribute to the safety of life and property, and it is towards an *amendment* of the rules, rather than a censure on their administration, that our remarks, so far as they apply to those rules, are directed.

Mr. Martell testifies as follows :—

"The demand for cargo steamers during the last year or two for the trying Atlantic trade, and the generally-depressed condition of other trades, have caused many owners to send vessels across the Atlantic in mid-winter who doubtless would otherwise scarcely have thought such vessels suitable." . . .

"As the steam-carrying trade became developed, and steamers became built for longer voyages in the Baltic and Mediterranean, greater length was given than in the earlier vessels, while all the objectionable features of extreme fulness of form and flatness of floor were retained. Two principal causes doubtless operated to retain these features in cargo steamers." . . .

"In the first place it was thought, the less the area of midship-section to drive through the water under the same displacement, the less the propelling power required. And secondly, that as steamers differed so widely from sailing ships in having no top-weight of heavy masts, and their stability consequently, when light, was so much greater, that there was less necessity to have a rise of floor to insure sufficient stability in shifting when discharged. Consequently the two great advantages were obtained in having a flat floor, *viz.*: the reducing the draft of water with the same displacement, and the carrying the greatest cargo under the same principal dimensions, whilst being able to place the engines and boilers as low as possible. The result of this has been to destroy nearly all beauty of architectural form in a large proportion of sea-going cargo steamers, by producing an approximation to a rectangular prism, whilst at the same time, as will be shown, it has at last been the means of introducing a positively dangerous element in this class of vessel." . . .

"Coming now finally to the vessel of the same length, 245 feet, and whose scantlings are continued of the full size to the upper

deck, similar to the vessels referred to which have recently capsized, and whose dimensions, as before stated, were, length 245 feet, breadth 33 feet, depth of hold 23 feet, it will be observed that this vessel has one foot more beam than the spar-decked vessel, but a very striking difference will, at the same time, be apparent in the practice of loading this type of vessel." . . .

"While the spar-decked vessel is supposed never to be loaded below the main deck, and consequently has the space between the main and spar deck only partially filled with cargo, *the latter vessel is purposely increased in strength so as to admit of the main, or rather the middle, deck being two or three feet below the water.* The effect of all this additional top-weight in the vessel above the main deck may be expected to render the stability small, and calculations show that the margin of stability under such conditions becomes dangerously low. In the case of the vessel I have been describing, whose constructed load line was within 4 feet of the upper deck, the metacentric height was only 0·7 feet. In other words, if the cargo shifted sufficiently to incline her through even a moderate angle, she would be in imminent danger of capsizing: thus scarcely creating surprise that such vessels have capsized, and that this has sometimes occurred a few days after leaving port." . . .

"From this it appears pretty evident that, whilst the types of steamers have been gradually altering through the stages described, from the flush-decked vessel of one deck and two tiers of beams, up to the vessel with two decks and three tiers of beams, or what is known as 'the three-deck' vessel, in each stage the top-weight being increased and facilities afforded for deeper loading—the necessary stability has not been made commensurate with the requirement for the latter type of vessel, and hence there are a large number of cargo-carrying steamers now in existence of this class to which great care will have to be applied in loading, particularly the smaller ones, when they are conveying homogeneous cargoes, if the accidents with which we are acquainted are to be avoided." . . .

"That the double-bottoms fitted to these vessels have in consequence of insufficient beam in some cases contributed to their loss there can be no doubt, but from the remarks one hears all

round it is evident that much misapprehension exists as to the influence which these water-ballast tanks have on the capsizing of vessels of this type." . . .

"The real source of danger to the vessel in fitting these tanks, I need not say, is in lifting the centre of gravity of a homogeneous cargo higher than it would be lifted by ordinary dunnage, and to this extent it renders a vessel more tender when loaded, and if her proportions and form make her otherwise a tender vessel, this influence might possibly render her dangerously unstable, and, without doubt, some of the recent losses may be attributed to this cause." . . .

"The owners of this vessel are well aware that were she loaded quite full between decks, so that her main deck would be under water, as is the practice with most of 'the three-deck' vessels of the same total depth, in the first gale she encountered when so loaded she would inevitably capsize. . . .

"Hence it is not only a question of beam, but also one of depth of loading." . . .

"Here we have the simple question of less profit on the 80 tons of coal or grain cargo, or a continuance of excessive risk, and from my knowledge of steam shipowners, I am of opinion there is not one would hesitate which to adopt when the two courses are clearly pointed out." . . .

"But notwithstanding that these suggestions may be adopted advantageously, and a more stable vessel be obtained, it still remains, if we keep to the present 'three-deck' vessels, that we have a type of vessel intended in point of strength to be so fully laden, but that, when so laden, having a very low freeboard, and therefore not the most suitable for encountering heavy seas." . . .

To sum up, Mr. Martell's testimony comes to this :—There is a class of vessel in existence "with two decks and three tiers of beams, or what is known as *the* 'three-deck' vessel." It "is *purposely* increased in strength so as to admit of the main or middle deck being two or three feet *below* the water." "There are a large number of cargo-carrying steamers in existence of this class to which great care will have to be applied in loading." "She would be in imminent danger of capsizing, and this has sometimes occurred

a few days after leaving port." "The result of" the reducing of the draft of water at the same displacement, the carrying of the greatest cargo under the same principal dimensions, "has been to destroy nearly all beauty of architectural form in a large proportion of sea-going cargo steamers, whilst at the same time it has been the means of introducing a *positively* dangerous element in this class of vessel."

This being the state of the case, and we implicitly rely on Mr. Martell that it is so, one would think that "the three-decked" vessel descanted upon as "not suitable far encountering heavy seas when fully laden" should not be fully laden, but should have a freeboard of from six to seven feet with a bulk cargo of grain or coal, and that anyone sending her to sea fully laden should be called to account. Instead, however, of proposing to give a warning to owners and masters of the absolute danger of fully loading these ships, either by a notice in the classification book which gives them the 100 A1 Class, or of putting a "Lloyd's mark" on the side of the ship, as is done with the awning-deck class, Mr. Martell propounds a conundrum as follows, viz., "when a vessel is covered with a lighter superstructure, such as an awning deck, for purposes of safety, and which cannot possibly be filled, or nearly filled, with cargo, unless the ship is allowed to be loaded below the main deck, I would ask why the space *actually* occupied by cargo should not be measured?" To put this tantalizing question in the form of a substantive proposition, it is "the space between the uppermost deck and the next deck below it should never be included in tonnage admeasurement (when the uppermost deck is a light superstructure) unless the said space is occupied by cargo; and when a part only of it is so occupied, then only the part so occupied should be included in the tonnage."

Unfortunately, however, this remedy will not apply to "the three-decked" ship now in existence, because no one can contend that her uppermost deck is an awning-deck, or a "light superstructure," so that even Mr. Martell's remedy, whatever it may do in favour of the new class of ship which he proposes to create, will leave alone the ship which he tells us is not the "most suitable" for contending with heavy seas, and the capsizing of

which scarcely creates surprise even when loaded as in point of strength they are *intended* to be. But does he mean that the "three-decked" ship shall receive a reduction of one-fourth of her net register tonnage in order to induce the owner not to load her so deep as to be in a condition *not* fit to encounter heavy seas?

Let us look for a moment at this proposal for exempting space from admeasurement on the condition that it be between the uppermost deck and the next deck below it. To put a parallel case: An owner of a house may be allowed to build an uppermost storey, say a flat of four rooms, but those four rooms shall never be subject to rates and taxes as a part of the house unless they are occupied, or partly occupied, and then they shall only be liable to taxation in respect of the parts actually occupied from week to week. It would be very perplexing to the tax and rate collectors even if the whole floor were to be liable to assessment when any part of it were occupied, but if only so much of it as might actually be used for the bedstead, the table, the washstand, and so forth, were liable to assessment and had to be measured, the difficulty would be immense, and an "army of surveyors" would have to watch and to measure. If this be so in the case of a house, which is a fixture, what would it be in the case of a ship? It seems to us, even thus far, that the remedy would be costly, inconvenient, and lamentably inefficient. But let us look a little further. The dock dues and the light dues amount to an aggregate which cannot be reduced. That is to say, the whole sum necessary for the service must be collected in the year. Say that an aggregate of £10,000 has to be collected in one year on the whole of the foreign-going ships. If the tonnage of ships is to be reduced all round, the rate per ton must be raised all round. If taxation is not to be reduced all round but is only to be reduced on steamships of such a character that with some cargoes they must, for bare life, leave a fourth of their internal capacity unoccupied, then there will be a direct transference of the incidence of taxation from that particular class of steamship to the strong steamship, which is carefully loaded, and to all sailing-ships; and these latter have but a poor time of it now.

Another point is that at the present moment no space which is

closed in on the uppermost deck can be measured for tonnage unless it is such as can be used for the carriage of cargo or stores. Surely this gives protection enough for openings round engine-rooms and cabin skylights, and for anyone to want more exemption, even in this respect, is to want what is unreasonable. But suppose Mr. Martell's concession as to space under continuous "awning" decks were conceded to the full, would he not, as a sound practical man, be the very first to condemn the action of the Legislature as tending directly to encourage the construction of dangerously weak ships? Would they be 100 A1, or anything near it, "in point of strength?" Where would be the top flange of the girder? and moreover the proposal is not at all that these "phantoms of the future" should be prohibited from carrying cargo in the 'tween-decks, but that they *should* be allowed to carry it, even to put the maindeck under water, on the condition that they pay dues for so doing. It would appear to us that danger rather than safety would be the direct result.

It is more easy for a register society, in assigning a class to a ship, to bring their rules into accordance with the wants of the case, from time to time, and to the fitness of that ship for heavy bulk cargoes, than it is to alter the whole international tonnage of the world, and if the indirect question, "whether the tonnage laws for all ships should be amended to prevent a certain limited description of steamship from going to sea in an overloaded condition," be a legitimate subject for discussion, then the more simple and direct question "whether the classification rules cannot be amended to meet the case of a limited number of steamships specially constructed under them," is, at least, equally legitimate, while it is decidedly more pertinent. The principle of placing a "Lloyd's mark" on a ship is already established in the case of awning-decked ships. The extension of this excellent practice is a very simple question. This point, however, does not once appear in Mr. Martell's otherwise excellent essay.

The ready and obvious remedy seems to be, now evidence is accumulating day by day, that the Committee of Lloyd's Register and the Board of Trade should go hand in hand, the one by giving some sort of an indication as to the depth beyond which in granting

classification to exceptionally deep "rectangular prisms," they think the vessel should never be loaded; an indication which the Law Courts have most emphatically decided that the Society is right in adopting: and the other by vigorously detaining such of these "prisms" (we use Mr. Martell's own word) as may attempt to go to sea with too little freeboard. If one or both of these remedies be applied we doubt whether any alteration in the Tonnage Law, or in any law, will be needed.

We have thought it imperative to make the above remarks, as the paper we have been reviewing might possibly have diverted attention from the real point at issue, which is "what is to be done with owners who send, and masters who take, ships to sea too deeply laden;" and which, Mr. Martell tells us in his own words, is the practice with *most* of "*the three-decked*" vessels of 24 feet depth of hold. His illustration is so striking, and his words are so positive (and with good reason, for he speaks as one having authority), that we conclude our remarks with them. In speaking of a properly loaded grain-laden vessel of the following dimensions, viz., 276 ft. long × 30 ft. beam × 24 ft. deep, which, because she was properly loaded did *not* capsize, when through an accident to the rudder chains she was abandoned in a heavy Biscay gale, he says:—

"The hold was entirely filled with grain in bulk, and as much stowed between decks as experience showed she could safely carry without making her unduly tender. The owners of this vessel are well aware that were she loaded quite full between decks, so that her main deck would be under water, as *is* the practice with most of 'the three-deck' vessels of the same total depth, in the *first* gale she encountered when so loaded, she would inevitably capsize."

The (alleged) almost universal overloading of this class of ship, the speedy but inevitable consequence, and the incidental loss of life, do they not demand as a punishment—or let us even say as a "remedy"—something other than an immediate and special remission of taxation to the amount of 25 per cent. in their favour?

NOTES ON THE MARITIME DEVELOPMENT OF JAPAN.

(*Continued from page* 121.)

IT is only since 1861 that the increase of the Mercantile Marine of Japan has been at all rapid. Every one of the important provincial governments, especially those having good harbours near the large centres of native trade, purchased foreign vessels. The class of vessels thus acquired has already been commented upon, and the great cost, compared to the advantages expected were long borne in the hope that in the struggle, which was then coming on, viz., the civil war, they would prove useful.

It was not until after 1869 that a commencement was made to organise the trade; the vessels in the hands of the trading agents of the principalities only made occasional trips to Osaka, Yedo, and back to their own ports; but in 1871, when a number of these vessels were collected together under one management, a regular coasting service was inaugurated.

In the earlier stages, great difficulties had to be contended with in collecting cargo at the various ports of call, and in its prompt shipment and discharge. There were also many other abuses. It was difficult to impress upon the natives the value of time, especially in the coasting service; and their lax habits frequently brought about a considerable loss through the ship and cargo lying idle for days, besides which there were the minor evils of detention of the passengers, &c., and dishonesty of the officers and crew, who generally contrived to occupy a great deal of space in the ship for their own adventures. The Formosan expedition formed a plausible excuse for a "ring" of clansmen to purchase a number of ships, that might have been chartered at reasonable rates, had honest men alone been permitted to manage matters, and subsequently pressure was brought to bear, and political as well as diplomatic trickery resorted to, whereby the United States Pacific Mail Company were relieved of their old coasters at a very handsome figure, to the great delight of the New York and San Francisco

stockholders. During this period, however, shipbuilding made little progress. One indefatigable man deserves mention, Mitchell of Nagasaki, who persevered in the face of many difficulties, and launched several vessels between 1863 and 1870. The natives at other places would fain have followed up this good example, but the rage for steamers for a time checked the demand for sailing vessels and small coasting craft. Recently, several wooden vessels of small size were built on an island at the entrance to the river that runs through the city of Yedo, at official instigation. The French employés at Yokoska also turned out some small craft and a couple of vessels of large size. Of late the building of three-masted schooners has become the rage, and many are in hand at various places, steamers being found to be too expensive for petty trade at small outports. Although it is on record that the Japanese made a voyage across the Pacific to San Franciso some eighteen years ago, without foreigners as navigators, few vessels had left the coast previously to 1874. Subsequently, several vessels have been dispatched with cargoes of rice to San Francisco, Manila, Hong Kong and other places, but then foreigners were hired to act as masters, mates, engineers, &c., and even Manilamen (Malay sea-cunnies) were hired as quarter-masters. The Japanese captain (so-called) went with the ship, but he had little authority off the Japanese coast; his presence on board did not tend to preserve discipline, nor to incite his country-men on board to the active fulfilment of their duties.

Since 1872 the class of men employed has steadily improved, especially as in recent years the foreigner has been vested with more real authority to enable him to carry out efficiently the responsible duties of master or engineer. A great number of men seeking employment has also given a wider range of choice to select from.

Examinations as to capability of seamen have recently been instituted, so that it is not so easy now for ignorant and unprincipled men to impose on the credulous natives, with false certificates and apocryphal testimonials.

Since the purchase of the mail boats of the American Company the new semi-official company, the "Three Diamonds" (Mitzu-

bishi), have run a regular service to Shanghai, and latterly to Hong Kong, but on board all the vessels, foreigners are employed, as well as in the offices on shore, in large numbers.

Several vessels have been rigged and sent to England to be refitted, and furnished with new boilers, modern engines, &c.; some old paddle-boats being "converted" into propellers, with all modern improvements; native crews, with foreign officers, sailing them out and home.

As we have previously intimated, there were but few Japanese who knew anything about steamers or even sailing ships of foreign build up to 1863, and the first vessels purchased were not so frequently out of harbour as to give very great opportunities for the men who formed the crews to gain any sea-going experience, consequently the crews of the vessels first purchased were altogether deficient in experience. The aptitude of the native character, and its great adaptability to circumstances, was strikingly shown in the efforts of the natives to dispense with foreign aid.

Sailing masters and engineers of dubious character, not always noted for sobriety or ability, even to the natives palpably so incompetent as to be unable to obtain employment on board of vessels owned by foreigners, were naturally begrudged $250 per month. It is not surprising that with such examples the training of Japanese on board their own vessels, with foreign hirelings, was unsatisfactory; but fortunately a small minority were enabled to educate themselves practically to some advantage, and even have obtained employment, within the past ten or twelve years, on board of foreign-owned vessels, there they learned their business under much better auspices.

The establishment (in which the writer had the good fortune to be instrumental) of a school of instruction for officers of the Mercantile Marine, is too recent to have as yet borne much fruit, but there have been many cases in which Japanese have proved themselves capable of becoming not only good seamen, but good officers, engineers, and mechanics, and who would have stood fair comparison, professionally, morally, and intellectually, with the erage English, American, or other foreign hireling.

The old School of Navigation was the Dutch. There are still

living eminent Japanese who in their youth went to Holland to study, and several Hollanders taught navigation and seamanship in Japan.

The Dutch gave place to the English gradually, and when the British Admiralty granted permission for a number of officers, leading seamen, &c., of our own Navy to enter the service of the Japanese Government as naval instructors, the old Dutch ideas faded away completely.

Since the collapse of the rule of the Tokugawa clan (misnamed Tycoonate) for years everything connected with the Mercantile Marine was in a chaotic state, and it was unhappily the interests of a powerful clique to prevent any order being evolved out of it. The absorption of the temporarily organized department for Formosa, by the post-office officials, and the transfer of the large fleet of comparatively superior vessels, formed a fitting opportunity for the adoption of some measures towards a thorough organization of the Mercantile Marine, but a grave error was committed in not putting it into the hands of the Japanese Naval Department. This Department had absorbed all the experienced, competent and intelligent sea-going men of the nation, leaving only the worthless and unreliable behind; the exigencies of the times necessitated some inducement being held out to these men, and the natural ambition of a class that aspired to rank with the two-sworded gentry, the comparative easy life and social position, tended to draw away from the coasting steamers our best men, as the Japanese purchased war vessels that they were obliged to man. Had the bold step been taken to at once establish a Naval Reserve, the mail service would have been a sea-going training school, alternating with intervals of drill and other necessary instruction. The captain, until very recently, hired and discharged his seamen at will, under the same police regulations as the carpenter or labour-master hired and discharged his journeymen, and there was a "kind of hail-fellow-well-met" feeling between all hands that permitted the too frequent case of orders being ignored or disputed, aye, and even the point argued at length; all hands had a word in, even the flunkies would "pass" an opinion and offer advice on professional points.

Efforts have very lately been made, commencing with tonnage and light dues, to establish some regulations, but up to the spring of 1876 but little real progress had been made.

The Japanese, over anxious to retain the control and monopoly of their own coast trade, and more than that too, as usual with them, risked much that was immediately practical and beneficial for the sentimental and national vanity.

They have, however, succeeded in inserting the thin edge of the wedge. The United States having nothing to lose, led the van in giving up treaty and international rights which the English could not afford to so easily sacrifice. The astute Japanese, listening to all councils, and too many have ever been over eager to whisper in their ears, to the detriment of foreign intercourse, allowed their feelings to sway them at times, but taking advantage of national jealousies and rivalries, they are steadily gaining their own point, or holding what they gain doggedly, and we must not blame them. They are now only taking a leaf out of our own book. Foreign, that is, English, French, and United States post-offices, are no longer in existence. English and French troops no longer have a footing on the islands. The Russians, it is true, go down to Nagasaki during the winter and occupy their old settlement, but there is not a suspicion that this is an occupation for any other than sanitary reasons, and that they are nominally guests, not intruders.

Foreign vessels, unless chartered, and the charterer must have official sanction, cannot load or discharge at any but the Treaty ports, but the old regulations as to coming to an anchor in bad weather and communication with the shore are not harshly enforced. The local officials are held liable for any breach of regulations as to trade beyond the absolute requirements of a vessel in distress.

C. PFOUNDES.

(*To be continued.*)

CORRESPONDENCE.

PITCAIRN'S ISLAND.

To the Editor of the "Nautical Magazine."

SIR,—I do not know whether you will consider it sufficiently interesting to the Mercantile Marine, but I venture to send the following information for insertion in the *Nautical Magazine* of next month.

The inhabitants of Pitcairn's Island in the South Pacific have lately, through the kindness of their friends in England, been supplied with a set of flags and the commercial code of signals, in order to enable them to communicate with passing ships if they feel inclined to do so. If, therefore, captains of ships are made aware of this, they may be on the look-out for signals on the island.

It is a matter of great importance to the islanders sometimes, lying so much out of the usual track of commerce in those seas as they do, to be able to draw the attention of passing vessels, so that they may have an opportunity to exchange fruit and vegetables for clothing and other useful stores, of which they are greatly in need at times. Direct communication between England and Pitcairn's Island is a tedious affair, as may be instanced by the time it has taken to convey boots and stores despatched from England last April, and which are just about arriving there, although the Admiralty have kindly rendered assistance.

I remain, your obedient servant,

G. H. GARDNER, Rear-Admiral.

Woodside, Eltham, March 3, 1880.

BASSES LIGHT DUES.

To the Editor of the "Nautical Magazine."

SIR,—Knowing the interest you take in shipping, I hope that you will not think this letter out of place in your valuable columns.

The Basses Light dues (Island of Ceylon), are charged on all steamers going to or from China, *viâ* Suez Canal.

There can be no doubt of the value of the Basses Lights to steamers bound to ports in Bay of Bengal; in fact, I may say, they are almost invaluable to them, but quite unnecessary to vessels going to and from China, as I do not believe ten steamers in the year sight them, more especially as steamers going home during the S.W. monsoon now almost invariably take the 1½° channel (except mail steamers calling at Point de Galle), which leads over 200 miles from Basses Lights. Even those steamers which go what is commonly called straight across, do not go within 50 miles of the coast (when going against either monsoon), to avoid the strong current setting round the land. Again, a steamer going eastward, and rounding Dondra Head five miles distant, and then steering straight for Malacca Straits, will pass just out of the range of the lights, even without a southerly set. Now, I do not consider it fair that steamers not using the lights should be made to pay the dues, which are rigidly exacted at Penang and Singapore, if not paid in England, and must be a serious tax to the owners of steamers running regularly to and from China in the course of the year, such as Holt's, Glen, and Castle Line of steamers, especially these dull times.

If the lights are sighted, and each master asked if he had seen them, then they should be paid; but I think there ought to be some exceptions when vessels go hundreds of miles from them.

I remain, yours faithfully,

W. W.,

Master of a steamer trading to China.

Singapore, February 3rd, 1880.

CURRENT BOTTLES.—VERIFICATION OF SEXTANTS.—WEATHER PREDICTION.

To the Editor of the "Nautical Magazine."

Sir,—I lately read with deep interest several of the notes and papers in your valuable publication, and, if you will allow me, should like to say a few words expressing the thoughts that occurred to me in course of perusal.

Imprimis:—My attention was first attracted on seeing the note

in your January number, on the "Traverse of a current bottle in the Great Southern Ocean." I am confident that, even now, interesting and curious, if not valuable results respecting ocean currents would be forthcoming if captains and others, more frequently put themselves to just a little extra trouble by casting adrift bottles (say, one daily, at noon), containing a note of the ship's position and date, with a request to the finder to report to the Board of Trade, Lloyd's, Geographical Society, or other such headquarters. It may be interesting to know that during the voyage of the *Hesperus*, from Port Adelaide to London, in 1878, I threw overboard, partly for the sake of having curiosity gratified as to ultimate results, about 150 current bottles, tightly corked and pitched, some 100 going over in the Indian Ocean. Six only have, it appears, yet been heard of, and I now give the particulars. One of many sent adrift on March 14th, in lat. 35° 1′ S., long. 19° 56′ E. (for the purpose of ascertaining if they would go ashore, take the West Agulhas current and go on down the Atlantic or curve back to the eastward towards the Antarctic drift), was picked up at Stanford's Bay some weeks afterwards. Of twelve thrown over in lat. 48° 19′ N., long. 10° 27′ W., on May 17th (1878), two were picked up on the island of Sein, on July 12th; one in the Baie de Quiberon, about August 21st; another on the coast of Finistère, August 15th; and a fifth on Brighton beach, Oct. 8th, following. Now, seeing that these were sent overboard almost before the ship felt Rennel's current, do not (I ask with much diffidence) the courses taken show us that bottles do not always drift with the current, but may, to a greater extent than in the opinion of Maury, be influenced by the winds? (See "Physical Geography of the Sea," p. 26.) Had the westerly winds not given influence in these cases, the bottles would probably have turned up in St. George's Channel or in the neighbourhood of Cape Clear. On the other hand, however, the W. and S.W. winds may possibly hold greater sway over Rennel's current than is generally believed; but I refrain from further remark on this subject, and leave discussion to those having a better knowledge and who are therefore more competent to form an opinion than myself. I would, through your Magazine, request that a look-out

be kept for my bottles, especially on Australian coasts and in the West Indies. In the event of any being picked up at sea, I would beg that the note be copied and sent adrift again with an additional note of the position where the bottle was found.

Secondly:—When reading your chapter on "The New Navigation and Sumner's Method" in last month's number, concerning errors, it at once struck me that few of our seafaring friends know of the immense advantage to be obtained by taking sextants for examination and verification to Kew Observatory. Some while ago I took my own there, and for the trifling fee of five shillings received a certificate setting forth that the sextant had been "examined at the Kew Observatory and approved for naval surveys, and for the determination of latitudes, local times and azimuths." In addition to this I received a table of corrections in consequence of slight imperfections in the cutting of the arc, in which the index error was taken into account. Surely the facilities thus afforded for the verification of sextants and the cancelling of errors need only to be generally known to the seafaring community in order to ensure due appreciation.

A few words on another subject—"The Difficulties of Weather Prediction." In the *English Mechanic* of the 13th ult., I endeavoured to show that these difficulties might be overcome by mooring reporting ships in the Atlantic to be connected with the cables. But assuming that, on the account of cost, such connexion is just now out of the question, and also the laying of cables to the Azores and Iceland or even the Faröe Islands, much might yet be done to advance our *knowledge* of Atlantic storms, leaving for the present the subject of forecasting in abeyance. Have we, I would ask, stations at present existing in the Western Islands (Azores), the Faröes, Iceland and the Lofodens, where systematic observations are at least twice daily taken from verified instruments, and from which our authorities receive, say, monthly reports? Again; are all the captains of the North Atlantic sailing ships and steamers furnished with instruments by the Meteorological Office, and do they, one and all, in their own interests and for the common good, send in official registers kept with scientific nicety? These,

Sir, are in my humble opinion questions of the very highest importance that, I fear, would be answered in the negative; and until a regular system of Atlantic observation is established and until *present opportunities and means are turned to the very best account*, so that we may learn more of the *nature* of storms, thus laying as it were a groundwork for future forecasting, we shall, I apprehend, continue "helpless when we attempt weather prediction on a large scale."

I am, Sir,

Your obedient servant,

CLEMENT L. WRAGGE, F.R.G.S., F.M.S.

Farley Meteorological Station, near Cheadle, Staffordshire,

March 9th, 1880.

THE CASE OF THE "PARLEMENT BELGE."

To the Editor of the "Nautical Magazine."

SIR,—The recent decision of the Court of Appeal in the case of the *Parlement Belge*, appears likely to produce some results, which, however perfectly they may be in accordance with International Law, and therefore also with the Common Law of this country, will be novel to the majority of travelling Englishmen. If the *Parlement Belge* is to be treated as a man-of-war is treated whilst in our ports, and *à fortiori* when at sea, so that no action will lie against her or her owners for damage inflicted by her on another ship, it is clear that no action will lie against her at the suit of a passenger who is injured whilst on board of her by the negligence of those comprising her crew, but he will be relegated to such remedy as he may have against the actual person, probably an impecunious seaman, whose negligence caused the damage, a remedy likely to be as difficult to enforce as the results, if enforced, would be illusory. Again, what is the law which governs those on board one of these vessels when in our ports, if not the law of England? Is it the Civil Law of Belgium or is it the Martial Law of that State? If this vessel is part of the public Navy of Belgium, it appears that it must be the latter, and if so, it might be well for intending passengers before going on board to find out what their

liabilities are. Perhaps it would be expedient that a copy of the Belgium "Articles of War," or "Code of Naval Discipline," should be exposed in some conspicuous place on board, as, if a passenger is liable to be tried by Court Martial, or summarily punished by the captain for an offence, such as, *e.g.*, one only too common in such vessels, making a mess on the deck, he would at all events wish to know what is the limit of the punishment he is likely to incur, for an offence probably involuntary on his part. It certainly seems strange that the liabilities and remedies of a passenger should vary so much according to whether he follows the finger-post directing to the Ostend boat or the Calais boat, the latter being a merchant steamer belonging to the South-Eastern Railway Company, or other British subjects, and reminds one a little of the notorious difference 'twixt Tweedledum and Tweedledee. Again, if a passenger loses his luggage by theft, or negligence, on board the Ostend boat, he cannot sue her owner, the King of the Belgians, for the loss, if his contract has been for the passage simply, though probably, if he has taken a through ticket from a railway company, or Messrs. Cook or Gaze, he might recover from them if they have not contracted themselves out of their liability, and they only would be the losers, having no remedy over. Again, if the Civil Law of Belgium is in force, supposing that there is no law in Belgium rendering lotteries or even public gaming tables illegal, may the steward of one of these steamers set up such a table or arrange for the drawing of such a lottery whilst lying alongside the pier at Dover. And may he sell liquor to all and every one during the prohibited hours on Sunday, &c., whilst lying in the same place. Though doubtless these abuses are not likely to occur, it would appear desirable that their occurrence should be rendered impossible. But questions may actually arise which would lead to very great difficulties. In the event of a disturbance on board a foreign ship of war, no doubt that disturbance would be quelled and the disturbers punished by those on board the ship even in a British port, and the interference of the police would be illegal and resented. (Phill. Inter. Law, Ed. II., Vol. I., sec. 344 ; Ortolan, Diplomatie de la Mer, Liv. II., chap. X., p. 187 ; chap. XIII.)

What then if a crime such as picking a pocket, an assault, or even a manslaughter is committed on board one of these vessels in Dover harbour, are the police to have no jurisdiction or power of interference? It is, again, the custom for Frenchmen desirous of fighting a duel to go to Belgium for the purpose; is it possible that we have a piece of Belgian soil moored alongside the pier at Dover for the convenience of bellicose Irish members of Parliament and others who are desirous of washing out an insult with blood, and who fear alike the penalty of the law of England and the inconvenience of a sea voyage? or can a fugitive from justice, when the offence is one not the subject of extradition treaties between England and Belgium, laugh at his pursuers from the deck of the *Parlement Belge* as safely as he could in the market-place at Antwerp, there being, apparently, no more reason for handing him over to justice than there is for surrendering a fugitive slave?

The judgment of the Court of Appeal leaves the *ratio decidudi* in the Court below entirely and intentionally untouched, and therefore the decision remains that the Crown of this country has no power, *proprio vigore*, to allow the exemption from jurisdiction granted to foreign vessels of war, or, as it must now be read, to vessels the property of a foreign government, and used in what that government considers a national service, to other vessels. That is, that any treaty purporting to grant such an exemption must be ratified by Parliament before becoming effective. This decision appears hardly consistent with the case of *Buron* v. *Denman* (2 Exch. 167); where the Court of Exchequer held that a treaty, made in the first instance between Captain Denman in command of H.M.S. *Wanderer* and the King of the Gallinas, and subsequently adopted by the Government, but certainly not approved by Parliament, was a bar to a claim for damage brought by a person whose warehouses or barracoons had, subsequently to the treaty, but before its approval by the Government, and in carrying out the provisions of it, been destroyed by Captain Denman. But the decision in that case appears rather to turn on the question whether the act of Captain Denman was justified by a subsequent ratification by the Government than on the validity of the treaty

made by him. The decision in the Court of Admiralty in the case of the *Parlement Belge* being clear on the point of the power of the Crown and its advisers in respect to treaties, the judgment of Sir Robert Phillimore must be considered conclusive, and if such an exemption cannot be granted to vessels without the consent of Parliament, it follows, as a necessary consequence, that it cannot be withdrawn from those which are entitled to it, except with the like consent.

If the position of these vessels belonging to the King of the Belgians and engaged in this service gives rise to such anomalies, and the Crown has no power without the consent of Parliament to vary the International Law on the subject, it certainly appears desirable that the consent of the King of the Belgians, and, if necessary, of the Legislature of that country, and also of Parliament in this country, should be obtained to some treaty or convention which, so far as regards liability for damage done, should declare that these vessels should be liable in the same or a similar way to that in which ordinary merchant ships are liable. As, *e.g.*, in certain cases a petition of right lies against the Crown, in this country, at the suit of a subject, which petition in almost all material particulars is conducted similarly to an action, and thus the immunity of the Crown from suits is prevented from working injustice to a subject; so the King of the Belgians might consent to have proceedings taken against the ship either in Belgium or England, or might agree that all questions of damage, done or alleged to have been done either by or on board these vessels, should be submitted to the arbitration of a court exercising the maritime jurisdiction in England or Belgium, and also that the ships themselves, and all on board of them should, whilst in English ports, be subject to all the municipal laws of this country, and the person offending against them should be liable to arrest and punishment by the Civil Law, and only by the Civil Law of the port in which they lie, or if on the high seas, by the Civil Law of Belgium.

Yours faithfully,

SEA LAWYER.

Temple, March 5, 1880.

THE STEERING OF SCREW STEAMERS

To the Editor of the "Nautical Magazine."

SIR,—I give you the results of a trial made with a screw steamer off the mouth of the Tyne for the purpose of finding out the effects produced by the helm and screw relatively when turning a-stern.

The *Tabor* is a screw steamer of 520 tons register, with engines of 90-horse power; her screw is right-handed and has four blades, tapered at the tops; her length is 208 feet, and breadth amidships 27 feet 8 inches. On Feb. 19th, 1878, she was in water-ballast, drawing 6 feet 6 inches forward and 10 feet 3 inches aft: wind, a moderate breeze blowing from S. by W. ½ W.; course on which all experiments were tried, W.S.W. The ship exposed about 12 feet of her bows to the wind, and was going between 7 and 8 knots an hour; all orders were executed within 8 to 10 seconds. No. 1, stopped, reversed screw, helm hard-a-starboard. In 1½ minutes ship's head had gone off 3 points to starboard. In 2¾ minutes had gone off 6 points to starboard and ship had lost her way; fore-and-main trysails set. No. 2, stopped, reversed screw, helm hard-a-port. In 1½ minutes ship's head had gone off 2 points to starboard. In 2¾ minutes had gone off 3¾ points to starboard and ship had lost her way; fore-and-main trysails set. No. 3 stopped, reversed screw, helm amidships. In 1½ minutes ship's head had gone off 4½ points to starboard, and in 2¾ minutes had gone off 7 points to starboard, and had lost her way: no sail set. Now, from these experiments, and from my own observations, I conclude that the screw has of itself very great power in directing the course of the vessel when going astern. That under the same conditions the helm has very little power to direct the ship's course, and that in regard to your problem, given in the March number, the current could not keep the stern of C pointing N. or nearly N. Also, that it is not possible for C to get to A in an hour, and I also beg leave to say that I think it is possible for C, with her stern pointing N., to get from B to A, but her course would be very erratic, and it would have to be achieved by alternately going a-head and a-stern. With regard to the stern being canted against the eye of the current under a reversed screw, I was mate of a

[illegible] on the last occasion of [illegible] was coming away, yet, [illegible] she swung round [illegible] ever running a rope [illegible]. I regret to say I [illegible]

[illegible] servant,

W. F. HUNT.

[illegible] Newcastle-on-Tyne.

[illegible]

[illegible] D.

[illegible] Magazine."

[illegible] and I beg, in the [illegible] present instance. Now, [illegible] number on "The Difficulties [illegible] under a strange [illegible] misconstrued them, or he [illegible] he has in the article [illegible] with any great [illegible] and would evidently [illegible] passing squall, causing no [illegible] the case of the Tay Bridge [illegible] a passing squall, which [illegible] been for the loss of [illegible] apply to the Tay Bridge [illegible] storm was confined to [illegible] over the whole of our [illegible] severe barometrical dis- [illegible] the westward of a deep [illegible] hours before it occurred. [illegible] the clouds at 10 a.m., [illegible] at Forest Hill, 4.10, I was [illegible] barometer. The barometrical [illegible] At eight a.m. a depression of [illegible] Weather Charts. During the

m.
of
C
R
ex
Pa
be
th

Be
an
to
app
and
Par
con
deci
way
cert
cour
mate
the
injus
to h
Engl
alleg
shoul
marit
ships
Englis
and tl
and pu
port in
Belgiu

Temple,

day it deepened, expanded, and extended westward, the barometer falling steadily over the S.E. districts; and at 3.50 it stood at about 29·5 at Greenwich. I was watching it closely, and from about 3.50 to 4.10 p.m., or say 20 minutes, it suddenly dipped nearly a tenth, and it was the general barometrical disturbance and this peculiar dip which led me to discover that the *Eurydice* disturbance had a fixed period of return. In May, 1878, I announced the fact to the Astronomer Royal and to the President of the Meteorological Society, giving, what I then believed to be the period, as two lunations; but on the 18th of May,* the same peculiar barometrical disturbance again occurred, and with this fresh data I eventually found that the true mean period is 28 days, and since that time I have proved to demonstration that its return and its effect on the barometer, force of direction of wind, &c., can be calculated as readily as the elements of a solar eclipse, as I think the following facts will show:—On the 17th of June last, at a meeting of the Meteorological Society, I gave the period, stating at the same time that the next transit would occur on the 13th July, and that it would be accompanied by a depression of 29·5. The Official Weather Chart shows that it occurred precisely as I had forecast. On the 17th December, *eleven days before the Tay Bridge disaster*, I announced through the press that the *Eurydice* cloud bands would pass between the 27th and 30th, accompanied by a depression of about 29·5 and *south-west winds*. Seven days later I sent out a forecast that the *Eurydice* disturbance would be followed by another depression of about 29·3 between the 1st and 3rd January, accompanied by strong S.W. winds. The Official Weather Charts show the isobars 29·5 on the morning of the 28th, lying over Aberdeen; and on the morning of the 2nd the isobar of 29·3 near the same place. Again, as soon as it was announced that the Princess Louise would sail in the *Sarmatian*, leaving on the 22nd January, I wrote that if the ship left on that day she would meet the brunt

* This sudden dip of the barometer was noticed at the Royal Observatory, and Mr. Ellis has since (June 17th last) read a paper on it before the Meteorological Society.

of the westerly gale which would be due to the recurrence of the *Eurydice* disturbance, which was due between the 23rd and 26th. The *Sarmatian* left on the 22nd, and was detained off Lough Foyle 15 hours by heavy weather, and had a boisterous passage. These are only a few of the instances I can give if necessary of the fulfilment of my forecasts to the *Eurydice* storm. These, however, I think are sufficient to show that there is one at least who can tell by actual calculation not only three days, but three weeks, months, or years in advance; and that the assertion that the *Eurydice* disturbance has a fixed period of return may deserve something more than "a moment's attention." And now if the *Eurydice* disturbance has a fixed period—as I assert it has—is it too much to suppose that all disturbances are governed by the same law, and that if we can calculate the elements of one, there is nothing to prevent the same being done for the rest?

Well, twenty years ago I proved to demonstration (see "Winds and their Courses") that the circular theory was erroneous,* and the application of the rules laid down by Piddington and others, dangerous in the extreme, and I now assert, and am prepared to prove, "that the law of the circulation of our atmosphere is as perfect as the law which governs the solar system;" the basis of the law being this, the earth is girded, parallel to and at right angles with *the magnetic* equator, by certain magnetic and electric cloud and earth bands, and it is by the revolutions, crossings, reversings, and changes, all of which can be calculated with mathematical precision, that all atmospheric changes are produced.

Yours truly,

G. JINMAN, F.R.G.S., F.M.S.,

Author of "Winds and their Courses."

Carisbrooke House, Forest Hill, S.E.,

February 16, 1880.

---

* Even Mr. Meldrum and Buys Ballot now admit this. I may add Mr. [Meld]rum was first led to this conclusion by "Winds and their Courses," [fa]cts to which I drew his attention, when I visited the Mauritius, [...] years ago.

THE TRADE OF CHINA.

THE following information sent from Shanghai by a correspondent of the *Times* is of so much interest that we republish it for the benefit of those of our readers who have not seen it :—

"But little as yet has resulted from the opening of the four new ports in 1877 under the Chefoo Convention. Considerable impatience at this untoward result has been manifested by the small, but noisy section of the foreign mercantile community in China who are given to agitation in all matters except in their own business. They forget that for years after the opening of Foochow under the Treaty of Nankin no foreign trade of any importance was centred there, and that the diversion of existing trade into new channels and the creation of new trade are both slow operations, at least in China. The development of the most southerly of the new ports, Pakhoi, in the Gulf of Tonqnin, has hitherto been arrested by a close monopoly of junk owners and Chinese merchants. All attempts to divert the carrying trade, which, as the port is the port of import for a large section of Southern China and the imports amount to millions of taels, is considerable, failed during the first two years. Mr. Consul Bullock, who was stationed there in 1878, was bold enough to predict that the junk monopoly would break down, and that the determination of Chinese merchants to abstain from the use of foreign steamers would certainly be abandoned, and I am happy to say that the close of the year has seen the fulfilment of his prophecy. Regular steamers now run between it and Hongkong, and I have little doubt that in the course of time the expectations formed regarding the trade capabilities of this port which were formed and urged by the late Mr. Mayers will be realized. Equally promising I think are the ultimate prospects of the new port of Ichang, for not only is it the natural port of import for the great province of Szechuen, but it possesses in its immediate neighbourhood and in close proximity to the river Yangtsze great beds of coal and coal mines worked in the primitive methods of the country. The experience of the past three years has, however, shown that local trade mainly centres at

Sha Shih—a town some 30 miles lower down the river than Ichang—to which our consular establishment and the Imperial maritime Custom-house should be removed, and that a special build of lightdraught steamers will be necessary for the carrying trade in the upper reaches of the navigable part of the Yangtsze. For the two other new points, Wuhu, on the Yangtzse, and Wênchow, on the coast of Chekiang, I cannot predict a great commercial future. As points of contact between European and Chinaman, and cêntres from which may radiate the influence of a permanent consul and an occasional gunboat, where missionaries may preach in security and opium be peddled in peace, they may have their uses; but it is not to such Chinese "Sleepy Hollows," the gates to "No Man's Land," that we can look for a permanent increase in the volume of English trade with China."

The Entrance to New York Harbour.—The National Government, since the British s.s. *State of Nevada* ran aground on the false shoals outside of Sandy Hook, has had the whole of that part of the entrance to the harbour surveyed, for the purpose of defining the present channel, and has also had tracing maps drawn to show where the new buoy has been placed. This buoy has been located about a quarter of a mile north of the other two buoys which previously marked the false shoal south of the main channel, and between which it was at one time easy for vessels to pass. It is claimed that the pilots knew of this false shoal, and had avoided it. It is further claimed that the State of Nevada would not have been run aground if it had not been for the fog deceiving the pilot as to the position of Sandy Hook light, and the soundings also proving defective from some cause. Few only of the pilots now use the main channel, for it is claimed that the swash channel is far better for navigation, the screws of the propellers going in and out keeping a clear water course. The tracing made by the Government is, however, posted up in the office of the Sandy Hook pilots, and attention called to it by an official notice from the Pilot Commissioners.—*New York Maritime Register.*

TIDE TABLES FOR APRIL, 1880.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge.		Hull.		North Shields.		Leith.		Devonport.		Dover.		Weston-super-Mare.		Liverpool.		Greenock.		Queenstown.		Kingstown.		Londonderry.		Brest.	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
Th	1	5 30	6 4	10 21	10 50	7 18	7 49	6 14	6 44	9 24	9 49	2 55	3 21	10 33	10 57	2 47	3 14	3 37	4 4	8 53	9 22	2 40	3 15	—	0 5	7 43	8 13
F	2	6 33	7 4	11 25	—	8 23	9 2	7 17	7 56	10 18	10 52	3 50	4 21	11 29	—	3 45	4 21	4 34	5 8	9 54	10 31	3 48	4 26	0 48	1 34	8 48	9 27
S	3	7 40	8 21	0 6	0 50	9 48	10 35	8 40	9 28	10 31	—	4 57	5 36	0 7	0 49	5 4	5 54	5 47	6 30	11 15	Mid.	5 8	5 58	2 26	3 12	10 12	10 58
S	4	9 6	9 54	1 33	2 14	11 18	11 58	10 13	10 52	0 16	1 8	6 16	6 56	1 34	2 18	6 43	7 26	7 13	7 56	—	0 42	6 34	7 13	3 52	4 27	11 44	—
M	5	10 38	11 15	2 52	3 28	—	0 34	11 27	11 57	1 48	2 28	7 36	8 11	2 59	3 36	8 4	8 35	8 35	9 8	1 22	1 58	7 49	8 24	4 57	5 22	0 24	0 57
Tu	6	11 47	—	4 0	4 2[illegible]	1 4	1 29	—	0 23	3 2	3 31	8 40	9 5	4 10	4 39	9 2	9 24	9 3[illegible]	10 3	2 29	2 55	8 49	9 16	5 44	6 4	1 25	1 48
W	7	0 16	0 40	4 51	5 11	1 50	2 10	0 44	1 4	3 57	4 20	9 27	9 48	5 5	5 29	9 44	10 3	10 25	10 47	3 18	3 40	9 38	9 58	6 24	6 44	2 9	2 29
Th	8	1 8	1 24	5 30	5 49	2 29	2 47	1 24	1 43	4 42	5 2	10 9	10 30	5 51	6 12	10 22	10 41	11 8	11 27	4 0	4 20	10 16	10 38	7 4	7 24	2 48	3 7
F	9	1 42	2 1	6 8	6 27	3 5	3 22	2 2	2 20	5 21	5 39	10 50	11 9	6 33	6 52	10 59	11 17	11 46	—	4 39	4 58	10 50	11 7	7 43	8 0	3 25	3 42
S	10	2 18	2 34	6 45	7 8	3 39	3 56	2 37	2 53	5 56	6 18	11 28	11 46	7 10	7 27	11 35	11 52	0 5	0 23	5 16	5 33	11 28	11 39	8 16	8 31	3 59	4 17
S	11	2 50	3 7	7 20	7 37	4 12	4 28	3 8	3 24	6 29	6 44	—	0 4	7 43	7 59	—	0 9	0 40	0 57	5 50	6 7	11 56	—	8 46	9 1	4 33	4 49
M	12	3 23	3 39	7 53	8 9	4 45	5 2	3 40	3 56	6 59	7 13	0 22	0 40	8 15	8 30	0 26	0 42	1 14	1 31	6 23	6 39	0 13	0 30	9 16	9 31	5 5	5 21
Tu	13	3 55	4 12	8 24	8 40	5 19	5 36	4 12	4 29	7 27	7 41	0 57	1 14	8 45	9 0	0 58	1 13	1 47	2 3	6 55	7 11	0 47	1 4	9 46	10 1	5 37	5 53
W	14	4 29	4 45	8 57	9 15	5 53	6 11	4 46	5 4	7 57	8 13	1 32	1 50	9 15	9 30	1 29	1 46	2 19	2 36	7 28	7 46	1 21	1 39	10 19	10 37	6 10	6 28
Th	15	5 1	5 18	9 33	9 52	6 29	6 49	5 24	5 45	8 29	8 45	2 9	2 28	9 45	10 0	2 4	2 22	2 53	3 11	8 4	8 22	1 58	2 19	10 59	11 25	6 47	7 7
F	16	5 37	5 58	10 13	10 38	7 11	7 36	6 8	6 33	9 2	9 22	2 48	3 9	10 19	10 41	2 41	3 3	3 30	3 52	8 42	9 [illegible]	2 40	3 3	11 55	—	7 30	7 53
S	17	6 20	6 47	11 8	11 42	8 5	8 38	7 1	7 33	9 46	10 15	3 33	4 0	11 6	11 36	3 29	3 58	4 18	4 46	9 31	10 0	3 30	4 3	0 31	1 9	8 24	8 55
S	18	7 17	7 49	—	0 19	9 15	9 56	8 9	8 50	10 48	11 27	4 29	5 2	—	0 12	4 33	5 13	5 16	5 52	10 36	11 16	4 39	5 17	1 51	2 33	9 33	10 14
M	19	8 25	9 7	0 56	1 33	10 36	11 14	9 31	10 9	—	0 11	5 36	6 11	0 51	1 30	5 56	6 38	6 31	7 9	11 55	—	5 54	6 30	3 13	3 48	10 55	11 32
Tu	20	9 50	10 27	2 9	2 41	11 48	—	10 42	11 12	0 53	1 34	6 46	7 20	2 6	2 41	7 15	7 47	7 45	8 19	0 31	1 5	7 2	7 33	4 18	4 43	—	0 7
W	21	10 59	11 29	3 12	3 42	0 19	0 47	11 40	—	2 10	2 42	7 52	8 20	3 15	3 47	8 17	8 42	8 50	9 17	1 38	2 8	8 2	8 29	5 6	5 26	0 33	1 5
Th	22	11 55	—	4 9	4 32	1 11	1 32	0 4	0 26	3 11	3 36	8 44	9 7	4 16	4 43	9 5	9 26	9 42	10 4	2 34	2 57	8 54	9 18	5 46	6 6	1 29	1 50
F	23	0 19	0 40	4 53	5 13	1 52	2 12	0 46	1 6	4 1	4 25	9 29	9 51	5 9	5 33	9 46	10 6	10 26	10 48	3 20	3 42	9 40	9 59	6 26	6 46	2 10	2 30
S	24	1 1	1 22	5 33	5 53	2 32	2 51	1 26	1 46	4 48	5 10	10 13	10 36	5 57	6 20	10 26	10 47	11 10	11 33	4 4	4 26	10 18	10 38	7 7	7 28	2 50	3 11
S	25	1 42	2 3	6 15	6 37	3 10	3 30	2 7	2 28	5 32	5 54	10 59	11 23	6 42	7 5	11 8	11 31	11 56	—	4 48	5 11	10 58	11 19	7 49	8 10	3 33	3 55
M	26	2 24	2 47	6 59	7 21	3 51	4 14	2 49	3 10	6 16	6 38	11 47	—	7 28	7 51	11 54	—	0 19	0 42	5 34	5 57	11 42	—	8 31	8 52	4 17	4 40
Tu	27	3 8	3 31	7 44	8 7	4 37	5 1	3 32	3 55	6 59	7 21	0 12	0 33	8 13	8 36	0 17	0 40	1 5	1 29	6 21	6 45	0 5	0 29	9 14	9 37	5 3	5 27
W	28	3 54	4 19	8 31	8 56	5 25	5 51	4 19	4 45	7 44	8 7	1 4	1 31	8 59	9 22	1 4	1 28	1 53	2 17	7 10	7 35	0 53	1 19	10 1	10 26	5 51	6 16
Th	29	4 43	5 9	9 21	9 48	6 17	6 44	5 12	5 40	8 30	8 53	1 58	2 25	9 45	10 8	1 53	2 18	2 42	3 7	8 0	8 25	1 46	2 14	10 53	11 25	6 42	7 10
F	30	5 34	6 1	10 16	10 47	7 18	7 45	6 10	6 41	9 18	9 46	2 52	3 19	10 31	10 55	2 44	3 13	3 33	4 2	8 51	9 20	2 43	3 13	—	0 8	7 40	8 11

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add*. – *sub*.), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 3	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 3	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 3	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Helgoland	+0 21	Dover
Holyhead	−1 12	Liverpool
[illegible] Island harbour	−0 53	N. Shields
[illegible]eur	+5 42	Brest
[illegible]ness	−1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 13	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 43	London
Youghall	+0 13	Queenstown

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London, W.C.; 6, Lord Street, Liverpool; and at Leicester.

ENGLISH (APPLICATIONS).

645. Alexander Davidson, Glasgow. "Improvements in raising sunken ships and other submerged bodies or structures, and in the means employed therefor."

667. Adolf Petersen, Hamburg. "Improvements in machinery for controlling steering apparatus in ships, and ensuring the action of the rudder in accordance with the officer in charge." (A communication.)

757. Luke Thomas, Bayswater, Middlesex. "Improvements in apparatus for raising and lowering ships' boats and other objects."

770. James B. Hannay, Glasgow. "A new or improved anti-fouling and anti-corrosion compound or mixture applicable for preventing the fouling of ships' bottoms and other submerged structures, and generally for the protection of metal, stone, wood or other surfaces."

781. Sir William Thomson, Glasgow. "Improvements in navigational sounding apparatus."

808. Thomas Britton, Sunderland. "Improvements in or connected with the construction of steam and other ships for carrying grain and other cargoes in bulk."

834. Walter C. Johnson and Samuel E. Phillips, Charlton, Kent. "Improved moorings for buoys, specially applicable to buoys used for marking positions in connection with the laying of telegraph cables and with marine surveying."

901. Soloman Chamanski, Rue de Ramberteau, Paris. "Improvements in apparatus for saving life and property at sea."

903. Robert Wright, Edinburgh. "Improvements in the fitting and fastening of fishing-rod joints."

957. William Rudd Oswald and George Stavers, London. "Improvements in the construction of ships to carry cargo in bulk."

985. Albert L. Blackman, Nashville, Tennessee, U.S.A. "Improvements in vessels and machinery for aërial navigation." (A communication.)

1056. John McLennan and Richard Owen, both of London. "Improvements in propelling vessels."

1073. Edward Bond, 323, High Holborn, London. "Improvements in and relating to apparatus or mechanism for hoisting and lowering boats or yards and in the mode of operating the same."

AMERICAN.

223855. William H. Mallory, Bridgeport, Conn. "A torpedo-boat."

224232. Theodor O. L. Schrader, New York. An oscillating ship's berth."

AUSTRIAN.

3044. E. A. Caminada, Delft. (Holland.) "An apparatus for telegraphing on board ships and for indicating the position of the rudder."

3154. J. J. Kunstadter, London. "Improvements in steering and propelling vessels."

3212. J. Peichl, Trieste. "A universal compensation for sea compasses, with a recorder."

3263. H. Satre, Lyons (France). "A sluice-vessel for transporting other vessels."

BELGIAN.

50213. D. Parks. "Modifications in ships' berths."

50229. L. E. Iverneau and V. P. Lambert. "A tidal motor."

FRENCH.

132286. Browne. "A life-boat."

132366. Jullien. "So-called 'terrestrial' torpedoes."

132582. Chabanais. "Compounds and apparatus for preserving and cleansing ships' bottoms and other marine structures."

132601. C. de Bruc. A ship's propeller with vertical paddles."

132683. Marotte Brothers, Paris. "A moveable hoist for unloading vessels."

GERMAN.

9111. M. F. Schmidt, Görlitz. "A motor for velocipedes, applicable to boats and trucks."

9211. C. A. McEvoy, London. "Improvements in apparatus for torpedoes."

9216. C. G. Norrenburg, Cologne. "Apparatus for propelling vessels, or so-called 'scull wheels.'"

PATENTS PUBLISHED (ENGLISH.)

Automatic Disconnecting Gear for Ships' Boats.

2384. June 16th, 1879. James Sample, Blyth, Northumberland. Price 6d. The invention may consist of the following parts:—Along the centre and at the bottom of the ship's boat runs a longitudinal rod having an eyejoint at the middle of its length, and rising upward at the stem and stern to a disconnecting apparatus conveniently secured to each end of the boat. Each apparatus consists of a sheath and hinged hook, but the hook being hinged to the upper part of the sheath is incapable of acting in the manner of a hook until it is brought down and so held by a strap working upon a centre pin and encircling the sheath. The outer arm of this strap is hinged to the end of the longitudinal rod. When the automatic disconnecting gear is in operation the hinged hook of each apparatus is brought down over the fall hook hanging from the ship's davits and secured by the strap being brought up over the point of the hinged hook. Upon the weight of the ship's boat and its contents being brought to bear upon the davits, the strain upon the hinged hooks would tend to open them and set the fall hooks free, but as the straps are connected together by the rod, one strap cannot operate before the other, and this can only be effected by the boat being uniformly supported and the strain taken off the stem and stern simultaneously. This being done, the eyejoint of the rod falls, which

by any ordinary system of levers depresses the inner arms of the straps, and sets both ends of the boat free from the davits. For the purpose of lowering boats aft, a spring may be employed within the sheath of the apparatus to act upon the strap and tend to set the hinged hook free when the weight is off the ship's davits.

Securing the Sheets of Fore-and-Aft Sails to the Deck.

3083. July 30, 1879. Robert A. Ray, Grimsby, Lincoln. Price 2d. (Not proceeded with.) The invention consists of a hollow cylindrical casting bolted to the deck of the vessel in the line of the keel, through the centre of which passes a vertical bolt, forked at its upper end to receive the shackle of the sheet block which is secured thereto by a cross-pin. The other end of the bolt terminates in a head provided with a nut and washer, which takes a bearing upon india-rubber blocks contained within the cylinder. The top of the cylinder is also covered by a disc of india-rubber, through which the forked end of the bolt projects. A partition is placed in the interior of the cylinder at mid depth, above and below which the springs are placed, in order to prevent the forcing of these out by the strain. With this device, the rigidity of the ordinary horse is entirely avoided, as the springs not only give to a lateral or perpendicular pull, but to both combined, no matter at what height the boom may be above the deck. In this manner, the risk of carrying anything away in jibbing or going about is considerably reduced.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
120	Baltic Entrance — Kattegat — Læso Island—North Rönner	New light.
121	Baltic—Bornholm	Various new lights, and proposed fog-signals.
122	North Atlantic—Azores—St. Michael—Ponta Delgada	Temporary light on breakwater.
123	„ Canary Islands—Lanzarote Island—Port Naos	Colour of south leading light.
124	Black Sea—Russia Soujak Bay—Capes Doob and Penai	Particulars of new lights.
125	Red Sea—Gulf of Suez—Suez Bay	Particulars of new leading light.
126	China—Banka Island—N.E. Coast	Sunken dangers.
127	South Australia—Spencer Gulf	New shoal.
128	New Zealand — Middle Island — East Coast—Akaroa Head	New light.
129	„ S.E. Coast — Cape Saunders	New light.
130	United States—Texas—Galveston Bar	New automatic buoy.
131	„ „ Galveston Bay —Clopper Bar	Light discontinued.
132	„ Florida — Fernandina Harbour	New range lights.
133	„ Delaware—Cherry Island —Flats Ranges, Delaware River	Particulars of new leading lights.
134	„ New York—Sandy Hook —East Beacon Light	Light changed in position.
135	Canada—Bay of Fundy—Grand Manan Island—S.W. Head	New light.
136	„ „ Fish Fluke Point	Particulars of new light.
137	„ „ Campobello Island —Head Harbour	New fog-signal.
138	North Atlantic—Great Bank of Newfoundland	Recent examination of locality.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

120.—Baltic Entrance.—*Kattegat—Læso Island.—Light on North Rönner.*—From a lighthouse erected on North Rönner, 3¼ miles northward of Holmen point, north-west side of Læso island; it is a *fixed white* light, varied *every minute* by a *red flash*, elevated 52 feet above the sea, and visible from a distance of 12 miles. The lighthouse, 46 feet high, is constructed of granite. Position as given, lat. 57° 21′ 30″ N., long. 10° 55′ 30″ E. It is intended to establish a fog-signal at North Rönner lighthouse. It will be a syren, worked by a caloric engine, which during thick

and foggy weather will give *three powerful blasts* in quick succession *every two minutes.*

121.—BALTIC.—*Bornholm.—Light on Due Odde.*—Respecting the exhibition of a light from a lighthouse erected on Due Odde, 1,717 yards from the south point of Bornholm; it is a *fixed white* light, showing a *white flash* every *one and a-half minute*, elevated 155 feet above the sea, and visible from a distance of 20 miles. The lighthouse, 100 feet high, is constructed of granite. Position, lat. 55° 0′ 15″ N., long. 15° 4′ 40″ E.

2. *Light on Due Odde Point.*—From near the south extreme of Bornholm; it is a *fixed white* light, elevated 52 feet above the sea, and visible from a distance of 12 miles. The lighthouse, 41 feet high, is situated S. 18° W. from the lighthouse on Due Odde, distant 1,147 yards. *Variation*, 10° *W.*

There will also be a *Fog-signal* near Due Odde point lighthouse; it will be a syren, worked by a caloric engine, which during thick or foggy weather will give *one powerful blast* every *two minutes.*

3. *Intended Fog-signal at Hammar Point.*—To be established at Hammeren (Steilebierg) lighthouse, near Hammar point, north extreme of Bornholm; it will be a syren, worked by a caloric engine, which during thick and foggy weather will give *two powerful blasts* in quick succession *every two minutes.* Further notice respecting the fog-signals will be published in due course.

122.—NORTH ATLANTIC.—*Azores.—St. Michael (San Miguel).—Ponta Delgada.—Temporary Light on Breakwater.*—It is now an ordinary light exhibited from the lighthouse on the breakwater, pending renewal of the lighting apparatus.

123.—NORTH ATLANTIC.—*Canary Islands.—Lanzarote Island.—Port Naos.—Colour of Southern Leading Light.*—It is a *fixed white* light.

124.—BLACK SEA.—*Russia.—Soujak Bay.—Lights on Capes Doob and Penai.*—With reference to previous Notice, the following particulars have been received :—

Cape Doob.—This light is *fixed white*, elevated 336 feet above [level], and visible from a distance of about 25 miles. The light [is visi]ble in two sectors, as follows : between the bearings N. 35° W.

and east (over an arc of 125°); and between the bearings of S. 36° 15′ 26″ E. and S. 28° 30′ 40″ E. (over an arc of 7° 44′ 46″); the latter sector illuminates the channel between Penai bank and the reef skirting the Penai shore, leading to Novorossiskaia (Novorossiusko) road. Approximate position, lat. 44° 38′ N., long. 37° 54′ 36″ E.

Penai Light.—Cape Penai is a point on the north-east shore of Saujak bay, and lies about N. 20° W. (true), $3\frac{1}{10}$ miles from Cape Doob. This light is *fixed red*, elevated 64 feet above sea-level and visible about 13 miles. This light illuminates three sectors as follows:—between the bearings N. 7° 1′ 12″ W. and N. 10° 28′ 48″ E., over an arc of 17° 30′, or over the channel between Cape Doob and Penai bank; between the bearings N. 41° 2′ E. and N. 58° 32′ E., over an arc of 17° 30′, covering the passage between Penai bank Saujak spit; between the bearings of S. 65° 54′ 11″ E. and S. 54° 12′ 11″ E., over an arc of 11° 42′, indicating the clear space in Novorossiusko road beyond the limits of Scheskari reef. Approximate position, lat. 44° 40′ 50″ N.; long. 37° 53′ 7″ E.

Caution.—Vessels navigating by the aid of these lights should keep within the limits of the bright light in either sector, as the limits of the illuminated angles are marked by a faint light, into which it is dangerous to enter. Bearings assumed to be true. *Variation*, 1° 20′ *W*.

125.—Red Sea.—*Gulf of Suez.—Suez Bay.—Exhibition of Leading Light.*—With reference to previous notice, a light on the north shore of Suez bay, as a leading light through the deep water channel westward of Newport rock, and the channel near the Spit buoy, thence to the anchorage in about 5 fathoms water, is now exhibited. It is a *fixed white* light, elevated 40 feet above the sea, visible through an arc of 14½°, or between the bearings N. 10¼° E., and N. 4¼° W., and should be seen from a distance of about 10 miles. Over the bay and its approaches—through an arc of 345½°, the light is obscured, and the obscuration covers Kal-el-Kabireh shoal, and the Spit buoy. The light is shown from a mast (upper part for about 20 feet painted black) above a white dwelling; placed on the following bearings, viz.:—South dock head, port

Ibraham (Observation spot), S.S.E. ¼ E.; Newport rock light-vessel, S. ¼ E., S$^{ly.}$; Kal-el-Kabireh shoal beacon, S. by W. ¼ W., W^{ly}; Atákah quarry, S.W. ½ W., W$^{ly.}$ Position, lat. 29° 57′ 35″ N., long. 32° 32′ 10″ E.

Note.—Approaching from southward, this leading light should be kept just open westward of Newport rock light, and be steered for, passing the Newport rock light-vessel at the distance of about 2 cables—the leading light must then be kept in sight till the Spit buoy is passed. *Variation*, 4¾° *W.*

126.—China Sea.—*Banka Island.—North-East Coast.—Sunken Dangers.*—Information, relative to reefs and certain isolated shoals situated to the north-east of Banka island; and in the northern approach to Gaspar strait; being the result of a survey recently made in H.N.M. Surveying-vessel *Hydrograaf*:—

A.—The following shoal spots hitherto marked on charts in the undermentioned positions, are stated not to exist:—

Columbia Shoal	in lat.	2°	21′	S., long.	106°	46½′	E.
Scheweningen Shoal	„	1	19½	„	106	40	„
Catherine Reef	„	1	30	„	107	1½	„
Pratt Rock	„	1	31½	„	107	23	„
Atwick Rock	„	1	48½	„	107	31	„

B.—More accurate positions with particulars of the following reefs, previously charted, are given as under:—

1. Sittard (Dutch or Vansittart) Reef in lat. 2° 11′ 32″ S., long. 106° 44′ 42″ E., 3¾ cables in extent, with a least depth of 1½ fathom over it, is steep-to, having 11¾ to 17¾ fathoms around.
2. A shoal in lat. 2° 2′ 5″ S., long. 106° 30′ 46″ E., 2¾ cables in extent, and steep-to, has a least depth of 1¾ fathom with 9¾ to 13¾ fathoms around.
3. A shoal in lat. 2° 4′ 30″ S., long. 106° 30′ 55″ E., three-quarters of a cable in extent and steep-to, has a least depth of 2 fathoms with 9¾ to 12¾ fathoms around.
4. A shoal (rock) in lat. 2° 1′ 47″ S., long. 106° 36′ 56″ E., extending 2¾ cables in a north-east and south-west direction and steep-to, has a least depth of 4½ fathoms with 13¾ to 15¾ fathoms around.

5. A reef (*Palmer Reefs*) in lat. 1° 57′ 54″ S., long. 106° 21′ 52″ E., 2¼ cables in extent and steep-to, has a least depth of 1⅛ fathom with 9¾ to 12¾ fathoms around.
6. A reef (*Palmer Reefs*) in lat. 1° 58′ 10″ S., long. 106° 22′ 42″ E., 2 cables in extent and steep-to, has a least depth of 1¼ fathom with 9¾ to 12¾ fathoms around.
7. Swan Reef, in lat. 1° 40′ 10″ S., long. 106° 17′ 32″ E., 2 cables in extent and steep-to, has a least depth of 1¾ fathom with 13¼ to 14¾ fathoms around.
8. Severn Shoal, in lat. 1° 37′ 10″ S., long. 106° 30′ 22″ E., 2 cables in extent and steep-to, has a least depth of 1¾ fathom with 16¼ to 17¾ fathoms around.
9. Wild Pigeon Reef, in lat. 1° 12′ 12″ S., long. 106° 41′ 40″ E., consists of two shoal patches half a cable apart and each half a cable in extent; the least depths on them are respectively 1⅛ and 3 fathoms, with 13¾ fathoms between and 16½ to 19¼ fathoms around.
10. Celestial Reefs consist of three shoal patches. One ot them, in lat. 1° 12′ 20″ S., long. 106° 46′ 40″ E., half a cable in length W.N.W. and E.S.E., with a breadth of 33 yards, has a least depth of 1¾ fathom.

    The second, in lat. 1° 12′ 45″ S., long. 106° 46′ 32″ E., one cable in length W.N.W. and E.S.E. with a breadth of 82 yards, has a least depth of 2 fathoms.

    The third, in lat. 1° 12′ 19″ S., long. 106° 46′ 20″ E., three-quarters of a cable long north and south, and a quarter of a cable broad, has a least depth of 2 fathoms.

    Between and around these reefs, which are steep-to, the depths are from 17¾ to 22 fathoms.
11. Hawkins Shoal, in lat. 1° 8′ 15″ S., long. 106° 41′ 10″ E., 1¼ cable in extent and steep-to, has a least depth of 4½ fathoms, with 16¼ to 18¾ fathoms around.
12. Vega Reef, in lat. 1° 7′ 35″ S., long. 106° 37′ 45″ E., consists of two shoal patches, one cable in extent and steep-to, with depths of 3 and 4½ fathoms; between them the depth is 14¾ fathoms and around 17¾ fathoms.
13. Ingram Reef, in lat. 1° 6′ 20″ S., long. 106° 34′ 45″ E.,

3⅓ cables in extent and steep-to, has a least depth of 4½ feet, with 16½ to 17¾ fathoms around.

14. Magdalen Reef, in lat. 2° 1′ 55″ S., long. 106° 59′ 45″ E., consists of two rocky patches from 6 to 19 feet in diameter and 87 yards apart; the least depth on them is 2½ fathoms, between and around from 18¾ to 19½ fathoms.

C.—The following reefs and shoals have been discovered, and positions with description of them are given as under:—

a. A reef, in lat. 1° 55′ 56″ S., long. 106° 24′ 45″ E., 33 yards in extent and steep-to, has a least depth of 1¾ fathom with 8¾ to 12¾ fathoms around.

b. A reef, in lat. 2° 1′ 5″ S., long. 106° 32′ 3″ E., 2 cables long north-west and south-east with a breadth of 87 yards, has a least depth of one foot and 13¾ to 15¾ fathoms around.

c. Four reefs of small extent and steep-to, lie between 1° 10′ 15″ and 1° 10′ 18″ S., long. 106° 45′ 55″ and 106° 46′ 24″ E., between them the depth is 14 fathoms, and around 17¾ to 18¾ fathoms.

d. A reef, in lat. 1° 9′ 25″ S., long. 106° 39′ 25″ E., 2¾ cables in extent and steep-to, has a least depth of 1¾ fathom with 15¾ and 17¾ fathoms around.

e. A shoal, in lat. 1° 9′ 50″ S., long. 106° 39′ 40″ E., 55 yards in extent and steep-to, has a least depth of 4¾ fathoms with 15¾ to 17¾ fathoms around.

f. A shoal, in lat. 1° 6′ 50″ S., long. 106° 36′ 35″ E., 55 yards in extent and steep-to, has a least depth of 3⅓ fathoms with 17¾ fathoms around.

g. A shoal, in lat 1° 6′ 50″ S., long. 106° 36′ 5″ E., 22 yards in extent, has a least depth of 5⅓ fathoms with 17¾ fathoms around.

h. A shoal, in lat 1° 7′ 15″ S., long. 106° 30′ 40″ E., 55 yards in extent, has a least depth of 4¾ fathoms with 17¾ to 19¼ fathoms around.

i. Three reefs extend in a S. by E. direction from the south point of Docan (Menalee) island; the outer distant 1¼ mile, has a least depth of 5¾ feet; the middle, a depth of 10¾

feet; and the inner (distant three-quarters of a mile from the point), a depth of 5 feet.

These reefs are steep-to, with depths around of from 11¾ to 16½ fathoms.

k. A shoal near Pulo Sato (Toedjoe or Seven islands), in lat. 1° 13′ 30″ S., long. 105° 13′ 55″ E., has a least depth of 8½ fathoms with 11½ to 13¾ fathoms around.

		Latitude.	Longitude.		Fthms.
l. 1.	A shoal in	1° 6′ 40″ S.,	106° 36′ 5″ E.	with a depth of	8¾
2.	„	1 6 30	106 35 45	„	7¾
3.	„	1 4 50	106 35 45	„	11½
4.	„	1 4 55	106 36 15	„	8¾
5.	„	1 6 10	106 34 0	„	8¾

Note.—All the above-named reefs and shoals are composed of stones and coral; they do not break nor is the water over them discoloured, so that navigation in their vicinity is very dangerous.

127.— SOUTH AUSTRALIA.— *Spencer Gulf.— Shoal.*— The s.s. *Governor Musgrave*, whilst proceeding from Franklin harbour towards Salt Creek cove, struck a rock having, it is supposed, about 10 feet of water over it. It was nearly low water at the time, and soundings taken gave 3½ fathoms. Approximate position of the rock, lat. 33° 48′ 30″, long. 136° 52° 15″ E.

128.—NEW ZEALAND.—*Middle Island.—East Coast.—Banks Peninsula.—Akaroa Harbour.—Light on Akaroa Head.*—Respecting the lighthouse then in course of erection on Akaroa head, eastern side of entrance to Akaroa harbour, the light was exhibited on 1st January, 1880. It is a *flashing white* light showing a flash *every ten seconds*, elevated 270 feet above the sea, and visible from a distance of 23 miles. The lighthouse, 28 feet high, is constructed of wood and painted white. Position approximate, lat. 43° 54′ 0″ S., long. 173° 0′ 20″ E.

129.—NEW ZEALAND.—*Middle Island.—South-East Coast.—Light on Cape Saunders.*—Exhibited from the new lighthouse on 1st January, 1880; it is a *revolving white* light, attaining its greatest brilliancy *every minute*, visible from seaward between the bearings of N.E. ½ N. and S.W. by W. Elevated about 210 feet above the sea, and seen from a distance of about 20 miles. The

lighthouse, 28 feet high, is constructed of wood and painted white. Position approximate, lat. 45° 53′ 15″ S., long. 170° 45′ 30″ E. *Variation*, 17° *E.*

130.—UNITED STATES.—*Texas.*—*Automatic Signal-Buoy off Galveston Bar.*—It is painted in black and white perpendicular stripes ; gives blasts of a whistle at short intervals ; and is moored in 5¾ fathoms water, the Outer bar buoy being distant one nautical mile, and the Galveston light-ship being nearly in line.

131.—UNITED STATES.—*Texas.*—*Clopper Bar Light, Galveston Bay.*—*Discontinued.*—After April 1st, 1880, the fixed white light used to mark the channel across Clopper bar will be discontinued.

132.—UNITED STATES.—*Florida.*—*Range Lights at Entrance to Fernandina Harbour.*—The lights known as Amelia Island North Range Beacons have been changed, and a new range established for crossing the bar in the best water at the entrance to Fernandina harbour. The new lights are *fixed red*, shown from skeleton frame towers pyramidal in form ; the front one painted white, the rear one white and black. For entering the harbour, keep the lights in range until the Amelia island main light bears S.S.W.; the bar is then crossed, and the vessel may be hauled up toward the entrance to Cumberland sound. Amelia island main light bears from front beacon S. ¼ W., 1⅝ miles ; Fort Clinch bears from front beacon W. by N. ½ N., ¾ mile ; Amelia island main light bears from rear beacon S. ¾ E., 1½ miles ; Fort Clinch bears from rear beacon N.W. ½ W., ⅝ mile.

133.—UNITED STATES.—*Delaware.*—*Cherry Island Flats Ranges, Delaware River.*—On and after April 1, 1880, two range or leading lights will be exhibited about half a mile above the Edgemore iron-works, to mark the channel dredged across Cherry island flats. The front beacon will be a *fixed white* light, 34 feet above mean low water, in a frame tower painted white and located on a pier standing near low water line. The rear beacon will be a *fixed white* light, shown on a tower 120 feet above mean low water, attached to a two-story frame building, both painted white. The beacons are about three-quarters of a mile apart, on a line bearing N.N.E. and S.S.W. The range intersects the deep-water point range in deep water, and vessels can pass directly from one to the

other. The channel which they mark is as yet but 50 feet wide the water on either side being of the original depth. To the westward it is deeper than to the eastward. Approximate position of the front beacon, lat. 39° 45′ N.; long. 75° 29′ 42″ W.

134.—UNITED STATES.—*New York.—East Beacon-Light.—Sandy Hook.*— In consequence of the encroachment of the sea upon site of the present lighthouse, the light will be exhibited, on and after the night of March 15, 1880, from the iron tower recently erected on the site occupied as the east beacon in 1850, and which is situated 375 feet from the present lighthouse structure, in a course bearing therefrom S. by E. The new tower is of iron, and painted red; the lantern is painted black. The light stands 42 feet above the base of the tower, and 46 feet above mean sea-level. The keeper's dwelling, a two-story frame building, painted white, is situated about 50 feet to the southward of the new tower.

135.—CANADA.—*Bay of Fundy.—Grand Manan Island.—Light on South-West Head.*—Exhibited from a lighthouse recently erected on Gull cliff. The light makes a complete revolution in *two minutes* showing *three white flashes* and *three red flashes* with intervals of eclipse of *twenty seconds.* Elevated 200 feet above high water, and visible from a distance of 24 miles. The lighthouse, 43 feet high, constructed of wood and painted white, consists of a square tower with keeper's dwelling attached. Position, lat. 44° 36′ 0″ N., long. 66° 54′ 15″ W.

136.—CANADA.—*Bay of Fundy.—Grand Manan Island.—Grand Harbour.—Light on Fish Fluke Point.*—From a lighthouse erected on Fish Fluke point, eastern side of Grand harbour, Grand Manan island; it is a *fixed white* light, elevated 40 feet above high water, and visible from a distance of 11 miles. The lighthouse, 32 feet high, constructed of wood and painted white, consists of a square tower with keeper's dwelling attached. Position as given, lat. 44° 40′ N., long. 66° 45′ 30″ W.

137.—CANADA.—*Bay of Fundy.—Campobello Island.—Fog-Signal at Head Harbour.*—At the north point of the harbour; it is a trumpet, which during thick weather, fogs, and snowstorms, will sound blasts of *eight seconds'* duration, with intervals of *thirty-five seconds* between them. Position, lat. 44° 57′ 40″ N., long. 66° 54′ 10″ W.

138.—North Atlantic.—*Great Bank of Newfoundland.*—Result of an examination of the Great Bank of Newfoundland in the vicinity of Virgin rocks, made by Staff-Commander Maxwell, Admiralty Surveyor; and also the position assigned by that officer to the Virgin rocks:—

Virgin Rocks.—The bank with depths of 9 to 20 fathoms on which these rocks are situated occupies a space 6 miles long in a N.N.E. and S.S.W. direction and one mile broad. The least depth found on the Virgin rocks was 3 fathoms over a small pinnacle, on which the sea breaks in heavy weather—from this pinnacle, two rocks with 4 and 5½ fathoms water over them, lie respectively N.N.E., distant nearly one cable, and W. by S., a quarter of a mile distant; these rocks with surrounding shoal ground of less than 20 fathoms, comprised within a diameter of about 5½ cables, form the *Main Ledge.*

South Shoal, with 4¾ fathoms the least water, is situated S. by W. 1¾ miles from Virgin rocks (Main ledge), and occupies a space 6 cables long in a N.E. and S.W. direction with a breadth of 3½ cables, the depths being under 20 fathoms. This shoal is reported by the fishermen to break heavier, and to be more dangerous than the Main ledge.

Main ledge and South shoal are the only dangers in ordinary weather, but several other spots on these shoals are reported to break in heavy gales—the foul ground, combined with the tidal stream, causing a confused sea even in strong breezes.

Position of shoal spot (3 fathoms) on Main ledge, lat. 46° 26′ 57″ N., long. 50° 47′ 40″ W., depending upon Chain Rock battery, St. Johns, being in 52° 40′ 47″ W.

Eastern Rocks.—The least water found on these shoals was 9 fathoms (*Nine-fathom bank*), near the centre of a group of shoal patches extending about 3½ miles in a N.N.E. and S.S.W. direction with a breadth of 2 miles, having depths on them of from 12 to 25 fathoms. Position of Nine-fathom bank, lat. 46° 26′ 45″ N., long. 50° 28′ 6″ W.

Note.—Eastern rocks are the easternmost shoals known to the fishermen—those with 18 fathoms or less over them, are reported to break in heavy weather; with a strong breeze there is a confused sea in the locality.

Tide.—In the immediate neighbourhood of Virgin and Eastern rocks, the tidal stream attains a velocity of three-quarters of a knot an hour, but a few miles from them it is scarcely perceptible—during the period of the examination, a slight southerly set was experienced.

Jesse Ryder Rock.—The position of this reported danger (lat. 46° 29′ N., long. 49° 41′ W.), was carefully examined throughout one day, but no indication of it was found either by variation in the soundings, or change in quality of bottom. The depths in the locality were found to be from 35 to 37 fathoms, over sand and shells.

Bertel Bank.—The position assigned to this bank (lat. 44° 43′ N., long. 49° 52′ W.) was also carefully examined, but no sign of it was found. The depths near the position were found to be from 27 to 29 fathoms, over sand and shells.

Note.—The masters of various fishing vessels, who have had many years experience on the Great Bank of Newfoundland, stated that to their knowledge, no trace of shoal ground exists near the reported positions of Jesse Ryder rock and Bertel bank. *Variation*, 30¼° *W.*

Hydrographic Notices recently Published by the Hydrographic Office, Admiralty, 1880.

No. 4.—Australia Directory, Vol. III., Notice 11; information relating to part of the west coast, from Shoal point, in lat. 28° S. to Cape Leeuwin; approaches to, and anchorages near, Swan river, &c.

No. 5.—China Sea Directory, Vol. II., Notice 1; information relating to Pulo Condore, Malludu bay (Borneo), Balábac strait, coast of Cochin China, Tong-King gulf, &c.

Charts, &c., Published by the Hydrographic Department Admiralty, in January and February, 1880.

No.		s.	d.
351	**Australia, east coast**:—Percy islands	1	6
2089	**Africa, east coast**:—Sheet 1, Tugela river to Delagoa bay	2	6

No.		s.	d.
797	North America lakes:—River St. Lawrence, Quebec to Kingston; with lake Ontario and lake Champlain	3	0
1763	China, east coast—Ou-kiang:—Wên-chau port and approaches	2	6
1812	Africa, east coast:—Kiuyu, George, Cockburn, ports. Chaki Chaki bay	2	6
2350	Plan of Cairns harbour added.		
292	Plan of Long and Story harbours added.		
134	New plan of Havannah harbour added.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

1923 *b*. North America, west coast:—Cape Caution to port Simpson, southern portion.
631 South America, Chile:—Smyth channel, from south entrance to Fortune bay.
28 England, south coast:—Salcombe river.
1670 *a*. Australia, east coast:—Moreton bay.
2304 Norway:—Karmö to Bergen.
87 Portugal:—Cape Finisterre to cape St. Vincent.
739 India, west coast:—Boria Pagoda to A'chera river.
755 India, east coast:—False point anchorage.
936 *a*. Pacific ocean—New Caledonia, north-west part
936 *b*. ——— ——— ——— south-east part
152 Bay of Bengal:—Preparis, north channel.
2123 Papua or New Guinea:—Orangerie bay to Bramble haven.
1189 Mediterranean:—Bonifacio strait.
163 Sardinia island:—Ports and anchorages on north and east coasts.
292 North America, east coast:—Harbours in Newfoundland.
2350 Australia, north-east coast:—Double point to cape Tribulation.
134 Pacific ocean:—New Hebrides islands.
834 Bengal bay:—Rangoon and Bassein or Negrais, rivers.
2121 New Guinea:—Freshwater bay to Round head.
2122 ——— Round head to Orangerie bay.
2123 ——— Orangerie bay to Bramble haven.
598 English channel.

OUR OFFICIAL LOG.

Official Inquiries at Home, 1880.

(*This List is completed to the* 18*th of each Month.*)

499. *Zingara*, wood; built at Bideford, 1866; owned by the master; tonnage, 194; Pomaron to Silloth; iron pyrites; lost on the Cumberland Coast, January 24, 1880. Inquiry held at Whitehaven, February 14, 1880, before Jefferson and Jackson, J.P.; Harris and Wilson, N.A. Accident due to the neglect on the part of the master to use the lead with sufficient frequency. Certificate suspended for three months.

502. *Calvilla*, s.s.; built at Sunderland, 1879; owned by T. E. Hick and others; tonnage, 913; Alexandria to Hull; grain; stranded at Donna Nook, Lincoln, January 19, 1880. Inquiry held at Hull, February 16, 1880, before Twiss, Judge; Hight and Ward, N.A. Master in default, but, under the circumstances, his certificate was not dealt with, but he was severely censured.

506. *Fanny*, schooner, and *Bavarian*, s.s.; the former built at Chepstow, 1837; owned by Mr. A. D. Payne; tonnage, 85; Cardiff to Cork; coals. The latter a screw-steamer, built at Belfast, 1869; owned by F. R. Leyland and others, of Liverpool; tonnage 2,027; Liverpool to Boston; general cargo; in collision off Queenstown, when loss of life ensued, January 9, 1880. Inquiry held at Liverpool, February 17, 1880, before Raffles, Stip. Mag.; Pickard, Beasley, and Curling, N.A. Master of *Bavarian* censured for proceeding at too high a rate of speed.

509. *Bengore*, s.s.; built at Seacombe, 1867; owned by Mr. J. Hoult and others; tonnage, 521; Cardiff to Gibraltar; coals; foundered off Cape Finisterre, January 23, 1880, when loss of life ensued. Inquiry held at Liverpool, February 20, 1880, before Raffles, Stip. Mag.; Beasley and Curling, N.A.; May, E.A. Casualty due to a leak in the fore part of the ship which continued to increase, and, owing to a derangement in the cock between the fore and main-tanks, the water could not be carried away.

510. *Ranavola*, barque; built at Tyne Main, 1861; owned by Mr. Wm. Lamb and others; tonnage, 891; Liverpool to the Tyne; salt; sustained material damage by stranding—1st, off the South Rock Light and subsequently on Muck Island, Antrim, January 29 and 30, 1880. Inquiry held at Liverpool, February 23, 1880, before Raffles, Stip. Mag.; Hight and Wilson, N.A. Court held that the accidents were caused by the careless and ignorant navigation of her master, and cancelled his certificate, but recommended that he should be granted one as mate.

511. *Clara Louisa*, brig; built at Bideford, 1854; owned by Mr. W. H. Lean, of Falmouth; tonnage, 153; Falmouth and Seville; ground china stone in bulk; abandoned at sea, January 21, 1880. Inquiry held at Falmouth, February 21, 1880, before Solomon and Webber, Justices; Ward and Parfitt, N.A. Abandonment justifiable.

512. *Maynards*, brig; built at Hylton, 1857; owned by Mr. J. Bedlington and others; tonnage, 327; Memel to United Kingdom; timber; lost on or near the island of Rugen, Prussia, January 8, 1880. Inquiry held at Middlesborough, February 23, 1880, before Coleman, Judge; Harris and Beasley, N.A. Casualty caused by the wrongful acts of the master in continuing his course in a dense fog, for making no allowance for lee way, and for neglect of the lead. Certificate suspended for four months.

513. *Eleventh Lancashire*, brig; built at Burton Stather in 1865; owned by Mr. J. Fisher; tonnage, 193; Swansea to Belfast; coals; stranded on St. Govan's Head, Pembroke, February 2, 1880. Inquiry held at Barrow-in-Furness, February 21, 1880, before Fell and Rawlinson, J.P.; Forster and Curling, N.A. Vessel lost through negligent navigation, a proper course not having been set, nor were soundings taken. Master's certificate suspended for six months; recommended for one as mate during that period. Mate to pay £5 towards cost of inquiry.

514. *Columbine*, s.s.; owned by Mr. John Dyson, the master; tonnage, 498; Cardiff to Bordeaux; coals; suffered material damage from an explosion which occurred on board when off Penarth Head, February 9, 1880, when loss of life ensued. [Inqu]iry held at Cardiff February 25, 1880, before Jones, Judge;

Grant, Parfitt and Wilson, N.A. Court found the master in default in not seeing that his cargo was properly stowed, trimmed and ventilated, and suspended his certificate for three months.

515. *Colonial Empire*, barque; built at Quebec, in 1861; owned by Mr. W. Wainwright and others; tonnage, 1,269; Liverpool to Pensacola; ballast; abandoned when about 60 miles N.W. of Tory Island, January 29, 1880. Inquiry held at Liverpool, February 26, 1880, before Raffles, Stip. Mag.; Hight and Ward, N.A. Abandoned in consequence of a serious leak having occurred and the pumps becoming useless from being choked with sand ballast. Master and crew justified in leaving her.

516. *Emblehope*, s.s.; built at Pallion, Sunderland, in 1870; owned by Messrs. Henderson & Woods, of Newcastle; tonnage, 1,255; Sulina to Antwerp; grain in bulk; abandoned in the Bay of Biscay, November 29, 1879. Inquiry held at Newcastle, February 14, 1880, before Rothery, Wreck Commissioner; Forster and Castle, N.A. Loss due mainly to the defective construction of the vessel and to her great depth in proportion to her beam. Abandonment justifiable.

517. *Lufra*, s.s.; built at West Hartlepool, 1872; owned by Mr. Ropner and others; tonnage, 878; Tyne to Genoa; coals; abandoned in the Bay of Biscay, November 30, 1879. Inquiry held at Newcastle, February 14, 1880, before Rothery, Wreck Commissioner; Forster and Castle, N.A. Casualty due to the vessel being overladen when she left the Tyne, and to the defective construction and high centre of gravity. Certificates of master and officers not dealt with.

518. *Tiara*, s.s.; built at Jarrow-on-Tyne, 1874; owned by Hall Bros.; tonnage, 1,173; Alexandria to Hull; grain, in bulk; abandoned off Cape Finisterre, November 29, 1879. Inquiry held at Newcastle, February 14, 1880, before Rothery, Wreck Commissioner; Forster and Castle, N.A. Loss due mainly to the unstable character of the vessel, and to her having been overladen for such a voyage at such a season. Master's certificate returned.

521. *Anne*, brig; built at Blyth, 1853; owned by R. Thompson, of Seaham; Hartlepool to Cowes; coals; stranded on Hope Point,

February 9, 1880. Inquiry held at North Shields, February 26, 1880, before Spence and Jackson, Justices; Forster and Castle, N.A. Casualty caused by the fouling of the wheel chains and not by default of master.

522. *Greece*, s.s.; built at Jarrow in 1863; owned by The National Steamship Company; tonnage, 3,242. Inquiry into circumstances of an explosion of gas, which took place at Hoboken, New Jersey, January 16, 1880, when loss of life ensued, before Balguy, Stip. Mag.; Aplin, Harris and Ronaldson, N.A. Accident due to a light having been taken into the hold by the stevedore's men without the knowledge of the officers of the ship. Master and officers exonerated.

526. *Norseman*, s.s.; built at Paisley in 1875; owned by J. and J. MacFarland, of Glasgow; tonnage, 93; Workington to Bowling; steel rails. Supposed to have been lost at sea, with all hands. Inquiry held at Glasgow, February 27, 1880, before Robertson and McCullock, J.P.; Beasley and Curling, N.A.; May, E.A. Court of opinion that the vessel foundered in a heavy gale of wind, off the Mull of Galloway.

527. *Baltic*, brigantine; built at New London, Prince Edward Island; owned by William Borren, of Llanelly; tonnage, 129; Swansea to Lisbon; coals; lost off Porthcawl, February 12, 1880. Inquiry held at Swansea, March 5, 1880, before Fowler, Judge; Hight and Ward, N.A. Casualty due to the incapacity of her officers arising from intoxication. Master's and mate's certificates cancelled.

528. *Prometheus*, s.s.; built at Sunderland in 1877; owned by Mr. A. Smith; tonnage, 1,043; Cardiff to Genoa; coals; supposed to have foundered at sea with all hands. Inquiry held at Newcastle, February 18, 1880, before Rothery, Wreck Commissioner; Forster and Castle, N.A.; Ravenhill, E.A. Loss attributed in all probability to the officer in charge having held on his course too long a time with the wind a-beam, causing the cargo to shift and the vessel to fall over on her beam ends.

529. *Joseph Ferens*, s.s.; built at Low Walker in 1877; owned by Mr. S. Hunting; tonnage, 1,176; the Tyne to Lisbon; ls; supposed to have foundered at sea with all hands. Inquiry

held at Newcastle, February 19, 1880, before Rothery, Wreck Commissioner; Forster and Castle, N.A.; Ravenhill, E.A. Loss attributable to the vessel being overladen, and to the want of stability.

Official Inquiries Abroad.

500. *Radnorshire*, s.s., and *Paria*, barque; in collision off Cape Bon, January 9, 1880. Inquiry held at Malta, January 26, 1880. Chief officer of *Radnorshire* to blame for porting instead of starboarding the helm. Certificate suspended for six months.

501. *Amoy*, s.s., and a fishing junk; in collision off Chelang Point, October 2, 1879, when loss of life ensued. Inquiry held at Hong-Kong, November 19, 1879. Collision due to want of proper care and skill on the part of the second mate of the *Amoy*. Certificate suspended for three months.

503. *Morpeth*, s.s., and *Collaroy*, s.s.; in collision close to Sydney Heads, December 10, 1879. Inquiry held at Sydney, December 22, 1879. No serious damage having taken place, no charge was brought against the masters.

504. *Zui*, schooner; lost at the entrance of Port Nicholson, November 23, 1879. Inquiry held at Wellington, December 2, 1879. Master to blame. Certificate suspended for three months.

505. *Helen and Jane*, schooner; lost on the rocks at Mussel Beach, "Te Wae Wae" Bay, November 12, 1879. Inquiry held at Riverton, November 21, 1879. Accident caused by the vessel missing stays. No blame attached to master.

507. *Annie Cotter*, schooner; lost on Hog Sty Reef, Bahamas, November 28, 1879. Inquiry held at Nassau, December 12, 1879. Casualty caused by action of current. No blame due to master.

508. *Celestial*, s.s.; stranded on Pan Shoal, Phio Straits, December 14, 1879. Inquiry held at Singapore. Master acquitted of blame.

520. *Crown Jewel*, barque; took fire, January 30, 1880. Inquiry held at New Orleans, January 31, 1880. Court found that the ship was wilfully set on fire by some person unknown.

523. *Sea Wave;* lost at East London, October 8, 1879. Inquiry held at East London. Mate guilty of an error of judgment. Master exonerated.

524. *Adelphoi*, barque; lost at Port Hacking, December 21, 1879. Inquiry held at Sydney, January 5, 1880. Master to blame. Certificate suspended for three months.

525. *Southern Cross*, barque; lost off Cape Douglas, January 8, 1880. Inquiry held at Port MacDonnell, January 15, 1880. Boatswain much to blame for not keeping a proper look-out.

530. *Lucy*, schooner; stranded. Naval Court held on board H.M.S. *Salamis*, February 27, 1880. No blame attached to master.

GENERAL.

NOTICE TO INTENDING EMIGRANTS TO BRAZIL.—Her Majesty's Consul at Rio de Janiero has been informed by the President of the Brazilian Council of Ministers that the Government of Brazil has suspended temporarily the Decree granting certain advantages to immigrants on their first arrival in that country. Persons intending to emigrate to Brazil are therefore *warned* that no assistance with reference to the disembarkation, reception, support, or settling of colonists is now afforded by the authorities, and that emigrants upon their landing will have to provide for themselves entirely at their own cost.—(Signed) THOMAS GRAY, Assistant-Secretary, Marine Department.—By Order of the Board of Trade, March, 1880.

THE
NAUTICAL MAGAZINE

FORTY-NINTH YEAR.

VOLUME XLIX.—No. V.

MAY, 1880.

THE INSTITUTION OF NAVAL ARCHITECTS.

THE opening meeting of the 1880 Session of the Institution of Naval Architects, saw the last appearance of Lord Hampton* as President, after a twenty-one years tenure of the office. His Lordship, then Sir John Pakington, was at the head of the Admiralty about the time when the Institution was started, and its promoters fortunately secured as their president, one whose unremitting attention to the duties of the office and admirable manner of discharging them, has in no small degree served to establish the success of the Institution. Lord Ravensworth, the new President, was a member of the Unseaworthy Ships Commission, and has long taken an earnest and intelligent interest in maritime affairs. The remainder of the first meeting, after the addresses of the retiring and the new Presidents, was taken up by the reading and discussion of a very able paper of great general interest and of especial interest to the owners and masters of merchant ships, which we in part discussed in our April number. It was entitled,

* It is with extreme regret that we have to record the death of Lord Hampton, on the 9th April last, a few weeks only after his retirement from the Presidential chair.

ON CAUSES OF UNSEAWORTHINESS IN MERCHANT STEAMERS,

and was read by Mr. Martell, the Chief Surveyor of Lloyd's Register.

Mr. Martell begins by referring to the recent frequent losses of steamers, and after adverting to the fact that while in many cases unfortunately no one has survived to tell how the vessel was lost, in others the evidence of survivors has been of such an exaggerated character that it has been of comparatively small value, he goes on to classify the probable causes assignable for shipping disasters thus:—

1. Weakness of structure from deficient or inferior material, or bad design or workmanship.
2. Deterioration causing local defects.
3. Absence of proper control over, or bad arrangement of, sea-cocks.
4. Faulty or deficient pumping arrangements.
5. Breaking down of machinery.
6. Bad navigation.
7. Inefficient protection of openings in the deck.
8. Hasty and improper loading, and deficiency of means for preventing shifting of cargo.
9. Deficiency of stability caused by disproportionate dimensions, combined with undue height of double-bottom.
10. Overloading.

As he attributes recent disasters to the four last-named causes, Mr. Martell thus briefly deals with the first six. He says there is no evidence to show that recent losses have been caused by structural weakness; evidence of survivors and scientific calculations and observations of Lloyd's surveyors all prove the contrary.

Local defects, however, are by no means uncommon in iron ships, in old ships built when cement was not so generally used as at present, and also in more recent cases, where inferior cement has been used. As an instance, a vessel's bottom plating ½″ thick was eaten through from the effect of a sugar cargo within six months from the date of launching, and in another case 80 of the iron floor

plates were so eaten through as to require doubling or renewal. Similar effects are often produced by the contact of copper pipes or roses with imperfectly protected bottom plating. This all shows the necessity of both frequent and careful surveys.

The loss of the *La Plata* and narrow escape of the *Amérique* exemplify the danger arising from insufficient control of sea-cocks; such dangers however are much less in vessels of more recent construction where it is usual to place all sea-cocks above the stoke-hole platform, where they are in sight.

The pumping arangements, especially in cases of vessels with water ballast, have not in the past been thoroughly efficient; it is desirable that they should be such as to enable the holds and tanks to be pumped out when the vessel is inclined, and all suction pipes should be capable of connection with the bilge pumps to main engines, and donkey pumps also.

Steamers of recent design built to carry cargo only, are much more dependent upon their engines than those of former types were, they have but small sail power, they are of unhandy form, and the propeller remaining immersed, is a cause of their steering badly when under sail. For these reasons, much greater care should be taken in the examination of all the details of the engines when in port than often is the case. The common arrangement of steering from the bridge amidships also introduces an element of danger in the complicated rods, chains, and sheaves necessary for that purpose.

Bad navigation is a common cause of loss, but probably the large increase of the value of shipping property committed to the charge of shipmasters of late years, has been met by increased efficiency on their part.

Having thus dealt with some of the causes of losses of comparatively new ships at sea, Mr. Martell goes at greater length into the remaining divisions of his subject. He thinks that due importance is not yet attached to the provision of proper protection for the various deck openings, and says:—"From want of due precaution in this, and in failing to provide proper coverings for stoke-holes and fastenings for coal bunkers, pipes or hatches, many losses I feel certain have occurred. When we hear of the

funnel and ventilators being washed away in some of our largest passenger steamers, with decks ten or twelve feet above the water, what are we to expect if proper attention is not given to these vulnerable parts in deeply-laden cargo ships, with a freeboard in some cases not exceeding four feet ?"

The employment of steamers for cargo-carrying alone, began on the North-east coast for the carriage of coals coastwise. Extreme fulness of form and flat floor were desirable for this trade, and when steamers were built for the Baltic, and afterwards Mediterranean trade, these characteristics were retained, partly from the mistaken notion that the less the area of amidship section, the less the propelling power required for a given speed on a given displacement. A flat floor gives a less draught for a given displacement, enables the engines and boilers to be placed low, and, combined with full ends, gives greatest cargo under the same principal dimensions. The double-bottom throughout the holds also may be traced to the requirements of the coal coasting trade. The design of the flush-deck coasting collier has developed through the stages of raised quarter-deck and monkey-forecastle, short poop, bridge-house, and forecastle, long poop, spar-deck, to the final type of three-decked steamer with full scantlings to upper-deck. Comparing these classes of vessels as regards their stability, Mr. Martell gives the result of calculations in a selected case of each type, showing that when loaded with a full cargo of coals or grain, the spar-deck vessel loaded so that her main-deck is above water, is very superior to all the others as regards stability, and the three-deck ship loaded deep is by far the worst. Even with a small initial stability the spar-deck vessel with the large freeboard has a large righting force when on her beam-ends, as was exemplified in the case of a vessel of this kind in 1877, abandoned in the Bay of Biscay, and although the cargo shifted, she was rolling about for three days in a heavy sea and did not capsize. The effect of deep loading is shown by the fact that in one calculated example an increase of stability is obtained by a foot more freeboard, greater than if the vessel's beam had been increased two feet. The conclusion arrived at is that three-deck ...ns of the existing type should, to ensure their stability, have

more freeboard, and that in vessels of this class built in future it is desirable to increase the beam. It must, however, be remembered that rapid dispatch has been so much aimed at as often to be the occasion of bad stowage, and without good stowage the best designed ship may be unsafe.

Mr. Martell next deals with the question of double-bottoms and water-ballast, briefly adverting to the absurd, popular notion that the air in the ballast-tank causes it to act like a balloon. Ballast-tanks are a commercial necessity; in some vessels where they are fitted, a cargo of light coal or grain in connection with an empty ballast-tank gives deficient stability; in such cases a compartment of the tank might be filled with water, this would make a very great difference in the stability.

A much better kind of vessel than the three-deck ship would come into existence if the awning-deck or spar-deck were not charged as much for tonnage dues as they are at present. The 'tween-deck space gives great safety to the ship, but earns no freight, and yet has to pay as much as if the whole ship were loaded to the upper-deck, and consequently loaded two or three feet deeper. Either the space actually occupied by cargo in the 'tween-decks should be measured or a deduction made from the gross space. In other ways the tonnage laws have a prejudicial effect upon the Mercantile Marine; in the case of high coamings, their measurement in the tonnage tends to discourage an obvious good. So with the protection of the engine and boiler openings, the tonnage laws encourage the bridge space with open passage ways. A complete bridge-house with water-tight doors would be a much safer and better arrangement.

Coming to the much-discussed question of grain cargoes, a considerable improvement was effected for some few years after 1872, a period when public attention was first directed to the subject. In Montreal the Port Warden has powers over the loading; in 1873 the fine for non-compliance with his regulations was increased from $40 to $800, "and since that time not a single grain-laden vessel from the port of Montreal has foundered at sea." Grain loaded in bulk by means of elevators is usually from the nature of the case imperfectly trimmed, and as a consequence the

settling is very much more than is usually allowed for. Shifting boards as often fitted, only three to four feet below the beams, are useless in the face of this consideration. When steamers of 1,200 to 1,800 tons are loaded within ten hours, as is often the case in American ports, it may be expected that the grain is not properly trimmed, and this accounts for the very great amount of settling often now observed.

Considering different types of vessels in regard to the carriage of grain, there is first the case of the vessel with one deck carrying grain so light that she might be filled without being overladen. With proper shifting boards and due care in trimming and pressing down the grain in the wings, this vessel might be loaded so as to be safe; or better still, the hold might be filled to within a few feet with grain in bulk, then filled up with grain in bags resting on boards. The shifting boards should extend to keelson. If a ship of this kind has to carry grain, which is too heavy to allow of her hold being filled with it, it is better to bulkhead off portions of the hold, so that where the grain is carried it should reach as nearly as possible to the deck. Such temporary bulkheads have often not been made strong enough to ensure efficiency.

Taking next the case of vessels with a lower deck laid, carrying light grain, it may be determined to make the lower-hold arrangements complete in themselves, as in fact in the case of the vessel with one deck, or a plan may be adopted for *feeding* the lower hold from the 'tween-decks as the grain settles. Either plan may be made efficient if properly carried out. It would appear desirable not only to have openings in the lower-deck for feeding at the middle line, but also at the sides, it being by no means certain that grain let down through the middle-line hatches will find its way to the wings. In the case of a vessel of this kind carrying heavy grain, it is necessary to combine with arrangements for feeding, such bulk-heading of the 'tween-decks as to shut off empty compartments in order that the spaces holding grain may be as nearly as possible filled. Mr. Martell thus concludes this part of his paper :—

"I cannot, however, pass from this question of grain-loading without a word on the proposal to carry all the grain in bags.

This is a question that is now receiving investigation by a Select Committee of the House of Commons, who will, I doubt not, arrive at a sound conclusion on the subject. That it would be more expensive there cannot be a doubt, and my enquiries have led me to the conclusion that this would amount, in an American voyage, to about 8¾d. per quarter, or say £360 per voyage in a vessel of about 1,200 tons nett register, including the cost due to delay in loading. That a cargo composed partly of bulk and partly of bag grain can be made as safe as a cargo containing all bags, is a question on which all practical men are agreed." The figures in the Table of Losses show that as many coal-laden as grain-laden steamers have been lost during the past winter. There is further the difficult subject of overloading. This is responsible for many losses. It is hoped that if attention be called to it, so as to show its great evils, further good may result. It is a decreasing evil.

In the discussion which followed the reading of this paper, Mr. Merrifield advocated a system by which a vessel's stability should be always calculated, so that the shipmaster should be aware of the character of his ship. At the same time the shipmaster should exercise more intelligence in supervising the loading.

Mr. Scott Russell thought that ships should be more effectually divided into compartments than at present; especially there should be a fore-and-aft bulkhead at the middle line. It would be better to carry the water-ballast in special compartments of the hold rather than in tanks as at present fitted.

Mr. Denny pointed out that an expenditure of a few hundreds a-year by the shipbuilder in obtaining information on the stability of ships built by him would be well laid out. With reference to greater beam, it was the case that while Mr. Martell was in favour of it, Lloyd's rules acted against it, for, by causing the longitudinal strength to be regulated by the breadth, depth, and half-girth of the midship section, the tendency was to increase improperly the scantlings of plates, &c., when the beam was increased.

Mr. John, in reference to the effect of the water-ballast tank upon stability, said that, making allowance for dunnage, the real lifting of the cargo was but one foot. Contrasting a merchant

steamer with an ironclad, the latter had her guns and armour mostly above water, the former had her weights mostly below, and yet the ironclads were so designed as to have enough stability. More calculations as to stability were wanted, but so many ships are alike that calculations for different types merely would be of great use.

Captain Symington, as a merchant captain, could speak from experience of the difficulty of stowing ships, owing to the irregularity with which cargo came, and the hurry in which it was stowed. Shipmasters had great difficulty in obtaining information as to the position of the openings under water in their ships.

After this came a short paper by Mr. Barnaby, the Director-General of Naval Construction, on

The "Nelson" Class,

which at present consists of but two ships, the *Nelson* and *Northampton;* they are the most recent armoured cruisers. Although designed as sister ships there is, strange to say, a difference in their speed of three-quarters of a knot. The *Bellerophon* is the most notable ship designed to perform similar service, and, in fact, one of these vessels will relieve her on the North American station. As compared with the *Bellerophon*, the *Nelson* is of the same size, has a less area of protected side, but her armour averages 7·28 inches in thickness, as compared with the older vessel's 5·28 inches, and the new vessels have also a much heavier armament. The *Nelson's* full speed is 14 knots; with two-thirds power she could steam 12½ knots and could carry coal for twelve days, steaming in that time 3,500 knots. At the lower speed of 10½ knots she could steam 5,000 knots. It must be remembered, however, that these vessels are fully rigged and are designed to cruise under sail. To ensure handiness they, like all recent war-ships, are short as compared with breadth, and consequently they are less economically propelled than are our large passenger steamers whose forms are so much more favourable to speed.

Mr. Scott Russell contributed this year a somewhat lengthy paper

On the True Nature of the Resistance of Armour to Shot.

Although the subject is treated with Mr. Russell's usual clearness and force, his conclusions are to a large extent based upon abstract theoretical considerations, and his references to experience are frequently to a date of some twenty years back. He concludes by recommending that the armour-plates should be placed inside instead of outside the skin of the ship.

Following this was a paper by Mr. A. C. Kirk, of Glasgow, on

A Method of Analysing the Forms of Ships and Determining the Lengths and Angle of Entrance,

of considerable practical value, as affording a ready means of estimating speed in the early stage of the design of a ship. From the nature of the subject the paper was only of interest to the designers of ships; an abridgment of it would be of no value, and we have not space to give it *in extenso*. The same may be also said of the next paper which was

On the Steam Trials of H.M.S. "Iris" and the Resistance of Screw-Propellers,

by Mr. J. A. Normand, of Havre.

Passenger Ferry Steamers

is the title of a paper of considerable interest, from the pen of Mr. John R. Ravenhill. In it he traces the history of the river steam traffic on the Thames from its commencement in 1815, by a small paddle-wheel steamer named the *Margery*, of 70 tons, and 14 horse-power. She continued to ply for a few months, but was frequently laid up for ten days at a time for repairs, and was withdrawn at the end of the first season. The *Thames*, a steamer a trifle larger, which commenced plying in 1816, met with better success, and another steamer was put on the next year. In 1821 they carried 27,000 passengers, and in 1825, 71,000. Seeing this success, other companies, among them the General Steam Navigation Company, put on vessels, and the first excursion trip on record was in 1830, when the steamer *Harlequin* took 400 passengers to the Nore and back. Up to this time passengers had to land and embark in watermen's wherries, but piers were provided

at London and, after the strenuous opposition of the watermen, at Gravesend also. With increased facilities for traffic in the three years following 1840, the average traffic per year exceeded a million, one million and three-quarters being the highest number since reached in a season. About this time iron steamers began to make their appearance, and there was great diversity of opinion as to the respective merits of iron and wood. The superior strength of the iron river steamers was, however, conclusively proved when, in 1843, the *Prince of Wales*, an iron steamer, built for the Margate packot service, was stopped on the slip in launching. She was for some time in a most trying position being unsupported for a length of 110 feet, but ultimately when she was got off it was found that her sheer was unbroken and that the damage was limited to one cracked plate and three broken frames. About the year 1851 the business of the old packet companies on the Thames reached its zenith, and soon after this the railways on each side of the river so successfully competed with it that some of the old companies were broken up and their boats sold off the station. One favourite boat in particular, the *Jupiter*, which had been built for the Thames, and which in 1861 had, during the summer, run over 17,250 knots, had so large a margin of strength for the work for which she was originally designed, that she was placed on the Dover and Calais passenger service and ultimately was turned into a blockade runner, but was, however, lost in the Bay of Biscay. After the old companies gave up the trade, most of it came into the hands of the Woolwich Steam Packet Company who extended the running to Sheerness, and who in 1865 ran the first saloon steamers on the Thames, having purchased them from the Clyde. The well-known *Iona* was the first saloon steamer on the Clyde which attracted much notice. Vessels similar to her have been built in Holland, and are now running upon the Rhine with much success. The remainder of the paper is occupied with a description of the *Princess Alice* disaster, and particulars are given of the scantlings and construction both of that vessel and of the old *Jupiter*.

Mr. Scott Russell gave some particulars of the earlier river boats, and spoke favourably of the present steamers on the Thames, also characterising the *Princess Alice* as a well-built, strong vessel

admirably suited for river navigation. Other speakers appeared to be of the same opinion, but Mr. Martell, Lloyd's Chief Surveyor, considered that the London river steamers are a disgrace to the metropolis, and that comparing them with the magnificent passenger steamers on the Clyde and on American rivers it was no wonder people did not travel on them. There was no difficulty at all in rendering them safe against collision by subdividing them below deck, the passengers being accommodated in saloons above the deck.

Mr. Dixon Kemp then read a paper on the "Stability of Yachts," which we propose to notice in a separate article.

Mr. W. John, of Lloyd's Register, in a paper

ON CELLULAR CONSTRUCTION OF MERCHANT SHIPS,

begins by remarking upon the long delay in applying the longitudinal system of framing in merchant ships. Many years ago Mr. Scott Russell advocated it, and practically carried it out, notably in the *Great Eastern* and in the *Annette*, and of the last-named vessel he gave a full description in a paper read as long ago as 1862. While the Admiralty have for years used longitudinal framing in ironclads and other vessels, it is only very recently that it has been taken up by the builders of merchant steamers. This is not due to the obstruction of Lloyd's, for they gave Mr. Russell's *Annette* their highest class. So much, however, has the system found favour that more than 100 steamers are now built or building whose bottoms are framed on the longitudinal, perhaps better described as the cellular, principle. These steamers have an aggregate tonnage of over 200,000. The first *cellular*-framed ship was the *Fenton*, built at Sunderland in 1876. Messrs. Denny, of Dumbarton, have taken the principle up so zealously, that it has been to a large extent associated with the name of that firm, and they have raised the question of tonnage measurement in connection with it, and having got the depths of the vessel measured to the tops of the longitudinal frames, ships so built will have less register tonnage for their size than those built under the old system.

In Mr. Russell's ships the whole of the framing ran lengthwise, and transverse strength was obtained by transverse bulkheads or

partial bulkheads. These bulkheads were a considerable hindrance to good stowage. The want of facility for working ceiling was also another drawback, and further there were in these vessels considerable areas of unsupported skin-plating, rendering them liable to great damage from grounding, or from striking piers, &c. True, more longitudinal strength would be gained by it, but it did not appear that ships built in the ordinary way were often deficient in that respect. In the Royal Navy some of the earlier ironclads were long in proportion to their depth, and longitudinal framing was resorted to for that reason, and its value was further seen in cases where heavy armour was carried at the extreme ends. In the Royal Navy the longitudinal frames were combined with transverse frames, the former being continuous, the latter in short pieces between them. Subsequently in the *Bellerophon* the "bracket plate" was introduced as a lighter form of transverse frame. This system of framing did not find favour with merchant shipbuilders on the ground of its superiority as regards strength, which could be better obtained otherwise. Many of our large ocean-going steamers of 400 feet and upwards are provided with ample longitudinal strength by the simple method of iron decks, skin-plating, and keelsons, without involving any excessive weight of hull, and the largest ship building at the present time, viz., 550 feet in length, for the Inman Line, is equally well provided in the same manner. It is only when an inner bottom is required, either for commercial purposes or for additional safety, that the cellular system may be expected to replace the old and well-tried mercantile system of construction. In water-ballast steamers up till recently the tank was put in as an addition to the pre-designed ship. It has of late, however, been managed otherwise, and the cellular system of framing, by which longitudinal frames are in various ways combined with transverse frames in the bottom of the ship, an inner skin being wrought above them, affords altogether the best arrangement for advantageous use of material when a water-ballast tank is an essential part of the design. Mr. John describes at some length various practical arrangements of detail of the present cellular system of construction of merchant ships, and concludes by an-

intimation that as the system is being now so extensively adopted, Lloyd's are likely to issue rules for scantlings, &c., which will place it in the same position as the ordinary transverse method of construction of iron ships.

In the discussion which followed, Mr. Scott Russell attributed the failure of his longitudinal framing to the opposition of Lloyd's, and was glad to find that the Lloyds' of the present day were more liberal in their views.

Mr. W. Denny said that his experience taught him that a double-bottom ship on the cellular system might be built with no more weight of material than one with a single bottom on the old system. The cost of workmanship was at first higher, but that had diminished as the men became accustomed to the new system.

Following this came two papers upon steel, of which the first, by Mr. W. Denny, of the Clyde, was entitled:—

Steel in the Shipbuilding Yard.

The mild steel now so much talked about was first used by Messrs. Denny, in 1876, in a light-draught steamer for service on the Irrawaddy. On one of her earliest trips she struck on a snag but came off safe and sound, her plating heavily indented, but unbroken. They have used the Siemens-Martin steel exclusively, and have been highly satisfied with it in all respects but one, the uncertainty of delivery, which is probably attributable to the manufacture being to so large an extent a new one. Out of consumption of, up to the present, 7,000 tons of steel, they can only point to a very small number of failures, very much less than might be expected with iron, and nearly all the failures were due to the working of the material at a *black* heat, which is the really unsafe thing to do with steel, and the foremen have now received instructions that it is not to be attempted, and that if a piece cannot be finished at a red heat it must be completely reheated or finished cold. The result of experiments as to the effect of annealing show that while it may be useful in the case of hard plates, soft plates may be injuriously weakened by it. With the kind of material used by Mr. Denny, even in such cases as beam-knees split and welded in several heats, annealing was proved to be

unnecessary and useless, and is therefore discontinued. Mild steel scrap has been used extensively by them for forgings, and they believe the product to be superior to that obtained by the use of iron scrap. Particulars of some experiments on the shearing strain of rivets are summarised as showing that whereas the shearing strength of iron is 19 tons per square inch of section, the tensile strength of the same material being 20 tons, the shearing strength of mild steel is 22 tons, the tensile strength being 29 tons. It would appear from this that a reconsideration of the subject of riveting in steel is called for, and that we shall require proportionately more riveting in steel than in iron ships, especially in the butts. At present Lloyd's do not sanction the use of steel having a higher tensile strength than 31 tons, and very properly allow a reduction in scantlings of only 20 per cent. Till lately Mr. Denny's firm kept within this limit, but they have now commenced in one steamer to use steel of 29 to 33 tons tensile strength and of a more rigid nature. Since the Admiralty began with mild steel, the tendency has been to a steady rise of strength. They began with 26 to 30 tons, Lloyd's adopted 27 to 31 tons, and the Liverpool Underwriters, 28 to 32 tons. May we not look to further progress in the same direction? A great hindrance to the use of steel is the uncertainty of the deliveries of the material, and this is much aggravated by Lloyd's system of testing at the shipyard. The Admiralty and the Liverpool Registry, on the contrary, have the material tested at the steel works. Testing at the maker's works is much more efficient, less costly, more convenient to the shipbuilder, and is not so productive of delay. Mr. Denny gives a number of tabulated results of tests, &c., and concludes his paper by quoting a report of some repairs done to a steamer which got upon a rock near New Zealand. So much damage was done to her that a number of the frames, if they had been of iron, would certainly have required renewal, but they were heated and restraightened and used again. Altogether the work of repair was much facilitated by the admirable quality of the old material which was used again, besides which it was clear that if the plates had been iron the vessel would have been so much damaged that she would have sunk.

On Steel for Shipbuilding

is the title of the following paper, by Mr. H. H. West, Chief Surveyor to the Liverpool Registry. After briefly referring to the well-known prescribed tests for mild steel and the limits of tensile strength hitherto admitted which do not justify any larger reduction of scantlings than has yet been admitted, seeing that the present mild steel is but little stronger than good iron, the author directs attention to the question of the desirability of using a stronger kind of steel in shipbuilding. He then gives a somewhat detailed description of the tests required by the Liverpool Registry. They have hitherto, like other controlling bodies, required a maximum limit to the tensile strength, on the ground that the material of high tensile strength was unreliable. Is this still necessary? Is not the quality of steel so far secured by the bending and temper tests that material of high tensional strength may be admitted if it satisfy these. Mr. West concludes by recommending that 30 tons per square inch be insisted on as the minimum tensile strength of steel, but that if the material passes a proper test for ductility there should be no maximum limit.

Dr. Siemens spoke in favour of the mild steel at present so largely used, as against a steel of higher tensile strength. Up to a strain of 15 tons per square inch, the two materials are precisely alike, and if the maximum strain to which a ship is subjected at sea, be no more than this the hard steel is no better than the other. Taking the case of a vessel bumping on rocks where greater strains are experienced, the hard steel will fracture, while the mild steel would stretch and bulge in. Further, the mild steel will not require annealing; the hard steel does, and in the process its strength is reduced some 20 per cent., thus losing its superiority in that respect. There is also danger of the hard material being injured by sudden chills.

Mr. Martell said that the Committee of Lloyd's Register, in face of the fact that hard steel in the process of annealing lost 25 or 30 per cent. of its strength, could hardly be asked to admit a further reduction of scantlings. The Committee had under consideration the difficulties experienced by the shipbuilder through their present regulation of testing plates at the yard.

Mr. Kirk, as a shipbuilder, had experienced the very great disadvantage of Lloyd's present plan of testing, and it would almost appear that having encouraged the use of steel at first they now wish to prevent its employment altogether. He was much in favour of the use of hard steel and would even be prepared to give up punching the plates and drill them if that were necessary to the success of the stronger material. Ships built some years ago of hard steel had succeeded.

Mr. Parker, of Lloyd's, described at some length a recent failure of some steel boiler plates of continental manufacture. When heated for the purpose of being flanged they cracked and laminated the whole length of their edges. They had successfully passed all the tests, and chemical analysis failed to explain the cause of failure, but at last it was found that the plates had not been rolled large enough to admit of a sufficient margin being cut off, and the middle of the plate on being tried was found to stand flanging as well as could be desired.

After some remarks by other speakers, some in favour of the use of a harder steel, some advocating caution, Mr. H. Laird, on the question of corrosion, said that in the case of the *Deerhound*, built in 1858 of Bessemer steel, the plates were only three-sixteenths thick, and a year or two she was in good order. The *Isabella*, built in 1876 of steel for the North-Western Railway Company, had recently been scraped and showed less signs of corrosion than might be expected in an iron ship. He also referred to the admirable quality of Siemens-Martin steel in the case of the *Stormcock*, which vessel bumped on something near a wreck, the result being that an indentation was made in the bottom about 16 inches in diameter and 7 to 8 inches deep, and yet so much did the material stretch that the leak was very slight and they were able to get the vessel into port.

Mr. G. Duncan, as a member of Lloyd's Committee, considered that that body were acting in the true interest of steel shipbuilding by rigidly enforcing their present tests on steel. They had at present an uncertain material to deal with, and none of the tests could be relaxed safely.

Mr. J. Inglis explained that shipbuilders did not wish any tests

relaxed, but wished them to be made at the steel works and not as at present at the shipyard.

A Simplification of the Thermodynamics of Steam is the title of a paper by Mr. J. MacFarlane Gray. Starting with the atomic theory, the author deals with the laws of motion as applied to the infinitesimal particles of the luminiferous ether. Sir Isaac Newton pointed out the illogical character of the notion of attraction or action at a distance, and evidently looked forward to a time when the cause of gravitation should be explained by the discovery of some wider law which would include it. This has not yet been reached. It has often been thought that the conception of a luminiferous ether filling all space, except that occupied by ordinary matter, and constantly in motion at high velocities, may lead to an explanation of many hitherto inexplicable phenomena. Many attempts have been made in this direction, but up to the present there has been one fundamental error which has vitiated all the reasoning—the size of the particles of the ether has been neglected. These particles, although they are exceedingly small compared with all our standards of measurement, and even with the ultimate atoms of ordinary matter, are not infinitesimal in a scientific sense, and their diameters cannot be left out of the question altogether. Having worked out this idea in general, Mr. Gray refers to the theory of heat as developed by Clausius and Maxwell, and proposes a new thermodynamic diagram, which he then proceeds to use in an exposition of the thermodynamics of steam. It is impossible for us in the space at our disposal to do more than state the aim of the writer; we can only recommend those of our readers who are interested in the science of heat and mechanics to read at length Mr. Gray's paper in the Transactions of the Institution. The consideration of the subject has evidently cost him much labour and thought, and whether he ultimately makes good his position, or not, the paper remains an able and bold attempt to unravel mysteries which have hitherto perplexed and baffled our greatest philosophers and mathematicians.

On Some Recent Experiments in Artificial Combustion, is the title of a paper by Mr. J. F. Flannery, who begins by

A

referring to the superiority of anthracite or, as it is sometimes called, "stone coal," in heat production, as compared with Welsh steam coal, or North country coal, or mixtures of the two. The anthracite has also the advantage in stowing closer, in producing no smoke, in not breaking up, and in not being liable to decay or spontaneous combustion.

Notwithstanding this, anthracite is not used as a steam coal because of its slow combustion, and because of its sudden disintegration when heated. To obviate the latter difficulty the fire-bars would have to be very close together, and this would aggravate the first disadvantage since more space for admission of air is desirable. An effort was made to pass a blast under the fire-bars to quicken the consumption, but the great heat melted the bars. A further proposal was to pass the blast *through* the bars, thus keeping them cool. This has recently been tried by Messrs. Penn in the boiler of a steamer named the *Elephant*. Mr. Flannery describes in detail the arrangements, and states that the results of the experiments were highly satisfactory, showing a gain of 40 per cent. in evaporation per square foot of fire grate, and the fire-bars stood the trial satisfactorily. Mr. Flannery says that his invention in addition to its making possible the use of anthracite coal in steamships, would also enable inferior foreign or colonial coal to be burned without the power of the boilers being thereby reduced.

A paper by Mr. C. W. Merrifield, on

J. Amsler-Laffon's Mechanical Integrator,

gives an interesting description of a very ingenious and beautiful machine, the object of which is to perform mechanically many of the laborious calculations necessary in connection with naval architecture and engineering. This paper concluded the Session of the Institution for 1880.

THE INTERNATIONAL STATUS OF MAIL PACKET-BOATS.

POSTAL packet-boats have always been favoured by the Law of Nations, as institutions *reciprocæ utilitatis*, and the special protection of them in case of war between any two maritime powers is usually guaranteed by the same treaty which regulates their communications by post. When the term "packet-boat" (paquebot) first came into use is not easy to determine, as very little is found on the subject of maritime posts in text-books of the Laws of Nations, but as the conveyance of the post by land was held to be a prerogative of the *dominum supremum* from very early times, we have little doubt that the earliest postal packet-boats were what may be termed Government boats, as being owned or chartered by the Government of one or other of the two nations, between whose ports they kept up a weekly or a daily service.

Since the commencement of the present century the subject of postal communications has undergone great development, and has been the subject of numerous international conventions. The dissolution of the German Empire of the Romans, and the creation of the Confederation of the Rhine in 1806, gave rise to a host of postal conventions between the Continental States of Europe, the object of which was to secure the continuous transmission of letters across the frontiers of neighbouring States for the mutual advantage of their subjects and in the general interest of nations in other parts of the world. But such conventions were only concerned with communications by land, for which there had been an organised service from a very early time in the German Empire, where the office of postmaster-general was an Imperial Fief hereditary in the house of the Princes of Tour and Taxis, whilst in France a system of posts was established as early as in the reign of Louis XI. In England, on the other hand, postmasters existed in very early times, but the post-office was first introduced in the reign of Charles I. The post-office, however, in England, cannot be said to have been permanently established for the periodical transmission of letters until the

first year of the Commonwealth. The post, indeed, in the sense in which the term is generally used in the seventeenth and eighteenth centuries, applies rather to the establishment of relays of horses for couriers and passengers than to a system of public mails for the conveyance of letters, and as regards postal communications between England and the Continent of Europe, there was little or no demand for any regular mail service at the commencement of the eighteenth century, if we are at liberty to construe the provisions of the Treaty of Utrecht of 1713 as implying at that time an almost total absence of mercantile communication by letter. Under the Treaty of Navigation and Commerce signed on the same day as the Treaty of Peace, between Anne, Queen of Great Britain, France, and Ireland, and Louis XIV., the most Christian King, it was provided by Article XVII., that "It shall be lawful for merchants on both sides in the places of their abode or elsewhere to keep books of their accounts and affairs as they shall think fit, and *to have an intercourse of letters* in such language or idiom as they shall please, without any molestation or search whatsoever." We are not aware of any convention between France and England for the transmission of mercantile letters by the agency of postal packets during the eighteenth century. In fact a condition precedent to the organisation of a regular mail-packet service across the Channel may be said to have been wanting, until Mr. John Palmer, of Bath, in 1786 organised the system of mail coaches in England, whereby the regular transmission of public mails to and from Dover was made reasonably certain. Accordingly we find that as soon as the first Act of the Napoleonic drama, as regarded war with England, was terminated by the definitive treaty of what has been styled the Peace of Amiens, a special postal convention was concluded under the auspices of the First Consul, between France and England, on May 17, 1802, whereby it was provided that a public mail should be conveyed by a French packet-boat from Calais to Dover on three days of every week, and on the alternate days a mail should be conveyed in an English packet-boat from Dover to Calais, and that the packet-boats of either nation should be required to take a

board all passengers of whatever nation they might be, the captains however being bound to submit such passengers to all the legal formalities required at the port of arrival. We may regard this Treaty as a new point of departure for the furtherance of postal communications between civilised nations, on the principle of reciprocity and mutual responsibility. It contained also a provision in its seventeenth article "that it should neither be annulled nor invalidated (infirmé) by either of the contracting parties without six months notice in advance, during which time it was to have full and entire execution given to it, without prejudice to the regulation and payment of the accounts at the expiration of the six months."* We have been unable to trace back any system of postal packet-boats between England and the Continent of Europe beyond the commencement of the present century, but it was aptly remarked to us personally by the late Chinese Minister at the Court of St. James's, that he found the European Law of Nations to be very reasonable, but he also found it to be very young; on the other hand he had also observed that since it had been adopted, wars had been less frequent in Europe. So we may say that the institution of postal packet-boats between England and the Continent of Europe may possibly date no further back than the commencement of the present century, which accordingly marks an epoch in the history of European public law, and from that time forward a series of postal conventions will be found recorded in the Archives of the Foreign Departments of the English Government, and of various Continental Governments, the purport of which has been to secure the adoption from time to time of the most improved system of postal packet communication, and at the same time the reduction and simplification of

* It appears that the arrangements under this convention of 1802 for the regular service of mail-packets were suspended on hostilities being resumed between France and England; but, after the peace of Paris of 1814, the regular service of the mails as provided by this convention was resumed by both post-offices, and was maintained in accordance with its provisions until other arrangements were made by the subsequent treaty of 1833.

the rate of postage. Further, it has been a capital object of all such treaties to provide, that the packet-boats engaged in the postal service shall, under no pretext whatever, be detained or diverted from their regular employment in conveying the mails and passengers.

We leave out of consideration, as having no immediate bearing on the system of packet-communication, the last great step in the unification of the rate of postage, which is one of the most extraordinary triumphs that the genius of modern commerce has achieved in the interest of the general peace of the world. Besides, it has not been a victory gained by slow and gradual stages of diplomacy, but like most achievements of genius, it has commended itself at once to general acceptation, as soon as its organisation was proved to be practicable. The packet-boat communication, on the other hand, has undergone frequent and gradual stages of improvement, which have been marked by a succession of international conventions, amongst which, for the moment, we are content to cite the three last postal conventions between France and England. The first of these is the convention of June 14, 1833 (Hertslet's Treaties, vol. V., p. 36), under which it is provided that "the packet-boats shall be national vessels, *bonâ fide* the property of the State. They shall be considered and treated in the ports of the two countries as vessels of war, and entitled to all the consideration and privileges which the interest and general importance of their functions demand, and shall not be detached from their specific duty of the conveyance of mails and dispatches by any authority whatever, or be subject to order of seizure, embargo, or *arrêt de Prince.*" It was further provided by the thirteenth article of this convention "that in case of war between the two nations, the mail packet-boats of the two offices shall continue their navigation without impediment or molestation, until a notification on the part of one of the two Governments that their services are to be discontinued, in which case they shall be permitted to return freely and under special protection to their respective ports." This treaty was concluded during the administration of the late Earl Grey, and the negotiators were the late Duke of Richmond, as Postmaster-General, and

M. Conte, the Director of the Administration of the French Posts. It was further thought desirable by the respective Governments of France and England, after the lapse of ten years, to conclude a new postal convention on a "more liberal and advantageous basis," and it was provided by Article VII. of the convention of April 3, 1843 (Hertslet's Treaties, VI., p. 348), that the packets employed by the two offices shall be national vessels, the property of Government, or vessels which shall be freighted by order of the Government. It was further provided, that both classes of vessels shall be considered and treated in the ports of Dover and of Calais, and in all other ports of the two countries at which they may accidentally touch, as vessels of war, and be there entitled to all the honours and privileges, which the interest and importance of their service demand. They shall be exempted in those ports as well upon their entrance as their departure from all tonnage, navigation, and port dues, excepting however the vessels freighted by order of the Government, which must pay such dues, in those ports, which are levied on behalf of corporations, private companies, or individuals. It was further provided that they shall not be diverted from their especial duty, that is to say, the conveyance of mails, by any authority whatever, or be liable to seizure, detention, embargo, or *arrêt de Prince*. The late Sir Robert Peel was at the head of Her Majesty's Government at the time when this convention was concluded, and the late Earl of Aberdeen, Her Majesty's Secretary of State for Foreign Affairs, was one of the negotiators of it. A still more liberal Convention was entered into by the French and English Governments on November 10, 1856 (Hertslet's Treaties, Vol X., p. 108), with the desire as recited in the preamble, "of strengthening the ties of friendship and neighbourly esteem, which unite the two countries, and of improving the communications by the posts of their respective dominions." It was accordingly provided by Article V. of this new convention, that packets subsidized by either Government should be admitted to the same privileges which had been accorded by the Treaty of 1843 to packets freighted by either Government. The terms of Article V. of the Convention are as follows:—"When the packets employed by the British post-office or by the French post-office

in execution of Articles I. and II. of the present convention are national vessels the property of Government, or vessels chartered (frétés) or subsidized by Government, they shall be considered and treated as vessels of war in the ports of the two countries, at which they regularly or accidentally touch, and be there entitled to the same honours and privileges."

"These packets shall be exempted in the said ports as well upon their arrival as upon their departure, from all tonnage, navigation, and port dues, excepting however the vessels freighted or subsidized by Government, which must pay such dues in those ports where they are levied on behalf of corporations, private companies, or individuals.

"They shall not on any account be diverted from their especial duty, or be liable to seizure, detention, embargo, or *arrêt de Prince*."

Now Lord Palmerston was at the head of Her Majesty's Government at the time when this convention was concluded, and the Secretary of State for Foreign Affairs was the Earl of Clarendon, and neither of these experienced statesmen thought it necessary to obtain from Parliament the confirmation of the privileges secured by this treaty to the French postal-packets in British ports, although the treaty was presented to both Houses of Parliament by command of Her Majesty, and although Parliament was asked to confirm, and had in fact confirmed by anticipation, the rates of postage agreed upon by this treaty, in other words had authorised the Commissioners of Her Majesty's Treasury to confirm by Warrant under their hands such rates of postage. It is hardly to be supposed that Lord Palmerston's Government would have omitted to obtain the confirmation of Parliament to the privileges granted to the French postal-packets in British ports, if the constitutional usage of the realm had rendered such confirmation necessary.

In our previous article on the case of the Belgian mail-packet, the *Parlement Belge*, we were careful not to travel beyond the scope of the argument addressed to the Supreme Court of Judicature under the restrictions imposed by the Court itself upon the counsel of the Crown, nor did we think it advisable for the purpose

of making clear to the reader the true purport of the judgment of the Supreme Court, that we should discuss the *ratio decidendi* of the learned judge of the High Court of Admiralty, seeing that the decision of that learned judge, which was founded on that course of reasoning, was overruled by the Supreme Court. The postal convention between England and Belgium which came in that case under the consideration of the Admiralty Court, is in fact drawn up in language almost identical, as regards the privileges of the postal packet-boats, with that of the postal convention between England and France of 1843. Although therefore the Anglo-Belgian treaty may be of comparatively recent date (February 17th, 1876), it is framed after a model of more than thirty years' standing, the principle of which has been applied with still greater liberality to the subsequent Anglo-French convention of 1856. It was therefore with some surprise that, in the *Nautical Magazine* of last month, which contained our article on the subject of the judgment in the *Parlement Belge*, we found in a subsequent part of the magazine a carefully considered letter signed by "A Sea Lawyer," and dated from the Temple, in which he maintains two positions, first, that the legal status of an English passenger on board the Belgian mail packet on its voyage to Ostend, is eminently disadvantageous to him as compared with the legal status of another English passenger on board the French mail-packet on its voyage to Calais, and secondly, that notwithstanding the decision of the High Court of Admiralty in the case of the *Parlement Belge* has been overruled, the *ratio decidendi* of the learned judge must be considered to be conclusive, that it is beyond the power of the Crown to allow to other than national vessels, the property of a foreign State, the exemption from jurisdiction in British ports, which is of custom granted to vessels of war. The Belgian Government, it appears, has found it consistent with the convenience of its naval service to carry the mails both ways, to wit, from Ostend to Dover, and from Dover to Ostend in national vessels, whereas the French Government has thought it more expedient for the French service of the mails and passengers, which by an arrangement between the two post-offices, is the day service as contrasted with the night service, to charter special

packets owned by the London, Chatham, and Dover Railway Company, which sail under the French flag, are commanded by commissioned officers of the French Military Marine, and are manned by crews in the naval service of the French Government. These important facts are probably unknown to the "Sea Lawyer," who has thought it his duty to warn the English passenger against the legal disadvantages under which he will find himself as subject to Belgian law on board the Belgian packet when crossing the Channel, if he follows the finger-post directing him to the Ostend boat instead of that directing him to the Calais boat, "the latter being a merchant steamer belonging to the South-Eastern Railway Company." We fear that the Sea Lawyer's suggestion, that the English passengers on board the Calais boat will have all the advantages of English law in case of sea-sickness, will prove to be a delusion and a snare to them, if they should indulge themselves in any quarrel with the steward, or disobey the order of the captain to leave the upper deck. It may escape the notice of passengers under such circumstances that they are sailing under the French flag, but it is well that they should know beforehand that the day packets to Calais are chartered by the French Government, and that the French flag under which they rightfully sail, determines the law under which they are navigated, and to which all persons who take passage by them are subject during the voyage.

The second position of the "Sea Lawyer" is, we think, equally untenable, namely, that because the Court of Appeal left the *ratio decidendi* of the Court below entirely and intentionally untouched, although the decision itself was reversed, the judgment of the Court below must be considered conclusive, viz., that it is beyond the power of the Crown, without the consent of Parliament, to grant to any foreign vessels, other than national vessels, the property of the State, an exemption from arrest in British ports. A judicial maxim has been attributed to Lord Chancellor Eldon, if we mistake not the identity of its author, that a judge should be cautious how he states reasons for his judgment, as he may be right in his judgment whilst his reasons for it may be wrong. Nothing, we think, would be more calculated to render judge-made law a

subject of deserved aversion, than if it were to be held that the reasons of a judge of a Court of First Instance must be taken to be conclusive of the law, which those reasons embrace, if they are not expressly overruled by the Court of Appeal, when the judgment itself, founded on those reasons, is overruled on appeal. We are disposed to think that in such a case the reasons of the Court below are rather to be regarded as "*non avenues*," to borrow a convenient phrase from French jurisprudence, if the case, in this instance, does not fall within the elementary rule of hypothetical reasoning, which, in the logical jargon of the Oxford Schools, is embodied in the phrase, *negato consequente, tollitur antecedens*.

TRAVERS TWISS.

RECENT LOSS OF IRON STEAMERS.

IN our number for February of this year we presented our readers with a special report, from the notes of our own reporter, of the circumstances attending the abandonment of the British merchant steamship, the *Barley Barrel*, and of her previous curious behaviour when she had been overtaken by any wind, or had been troubled by a ruffle on the sea. In our number for last month we were able to reproduce extracts from a paper, absolutely invaluable, read by the chief technical officer of the Committee of Lloyd's Register, to an assembly of shipbuilders, engineers, shipowners, and others, at the Institution of Naval Architects. In our number for this present month we submit extracts from reports of two recent inquiries, viz., those respecting the *Marlborough* and the *Kensington*. Before we commence with these two cases we may observe that the object we had in view in presenting our readers with our own report of the *Barley Barrel* disaster, was to emphasise what we have for long thought to be vicious, viz., the supreme ignorance indulged in, professed, and paraded by many shipmasters, shipowners, ship-managers, and even shipbuilders,

respecting load lines and loading and its direct consequence, that is to say, the personal inconvenience and discomfort and losses of limb and life too often endured by the masters, officers, and crews, in their endeavours to navigate, what we have hitherto called "parallelopipedons," and the chief technical officer of Lloyd's Registry has described as "rectangular prisms," when they are loaded deeply. "They are called by a much coarser name out of doors." In the case of the *Barley Barrel* we had not the benefit of a Government copy of the case; we therefore had to rely on ourselves, and we are solely responsible for any inaccuracy in our report of that case. In the cases of the *Marlborough* and *Kensington*, we have been furnished with printed copies directly by the Board of Trade,* so that we can in those two cases speak with absolute confidence, and that is, on the faith of documents bearing the high and unimpeachable signature of the Wreck Commissioner himself.

If it had happened that the important case of the *Barley Barrel* had unfortunately slipped by without a record; or if, by a greater misfortune, the chief technical officer of Lloyd's Registry had not awakened and laboured so earnestly, and so successfully and conclusively as he has done, to show that "*the* three-deck ship," is far too often "liable to capsize," "soon after leaving port," the reports in the cases of the *Marlborough* and the *Kensington* would have taken us by surprise. On the authority of Mr. Martell, however, we can review them the more calmly, as he has shown in his paper that casualties of this sort must, in our researches into the subject of wrecks and casualties, be regarded as matters of course—of certainty rather than of accident—but in endeavouring so to treat them we are not quite able to remove from our own minds a sort of unpleasant feeling, a depression, an oppressive sadness that will assert itself; on account of a doubt whether a little exercise of knowledge, coupled with a little gleam of sympathy, a tiny sparkle of humanity, thrown in to leaven a hard business transaction, might not, and

* [We believe that the Board of Trade will furnish copies to any one who applies.—Ed.]

probably would not, have prevented waste of life, and have helped to send a gleam or ray of a cheerful tint, even through the medium of one of Mr. Martell's "rectangular prisms." It has been stated that "boards" are unassailable, as they have "no souls to curse or shins to kick;" but the report in the case of the *Marlborough* raises a doubt whether a shipowner may not possibly be sometimes even without "bowels" of compassion, when sending a deeply-laden ship to sea. It is abundantly clear that the owner of that vessel had no sort of desire or intention to lose the ship; indeed, we believe that he thought, hoped, and calculated that she would get through with safety and with profit. Nevertheless, the case, as reported by the Wreck Commissioner, is just one of those in which professed ignorance was all but triumphant, and one that really goes far to make Mr. Plimsoll's agitation justifiable, and his wrath against "the owner's load-line" almost a virtue.

As regards ignorance, or neglect of a vital point, what, for instance, can persons connected with the management of ships say or do, but confess contrition on reading such a passage as the following from the Wreck Commissioner's Report on one of the cases under review:—

"The fifth question, upon which our opinion is asked, is 'Whether, looking to the form and dimensions of this vessel, and the nature of the cargo she had on board, she had sufficient stability for a winter or any voyage?' Now the first thing that strikes us is that neither in this nor in any of the other cases of the same description that have come before the Court, do the builders or the owners ever seem to have taken the least trouble to ascertain whether the vessel was or was not a stable ship, what was the position of the metacentre, what amount of cargo she could safely carry, or to what depth she could be safely laden; with none of these questions do any of these gentlemen seem to have concerned themselves. The practice seems to be for the owner, who may be, like Mr. Garbutt, the owner of the *Marlborough*, previously totally unacquainted with ships or shipping matters, to give to the builder certain dimensions, according to which he requires the vessel to be built. The builder takes the dimensions and builds the ship without considering whether the dimensions

are in due and proper proportions, or whether the ship when built will be a stable ship, and capable of carrying the cargo which could be put into her. Thus Mr. Tate, the builder's draughtsman and the designer of this vessel, says, 'I have never made any calculations as to her stability. We take the dimensions from the owner, and build the ship to those dimensions, without making any calculations as to her stability.' Again, Mr. Walton, the owner's superintending engineer, says, 'I never considered her stability.' Mr. Dobson, too, the builder's manager, says, 'we never calculate the stability of the vessels we build; we never calculate the position of the metacentre.' That gentlemen should invest money to the extent of some £30,000 or £40,000 in a vessel, and send her to all parts of the world, without having previously ascertained whether she is capable of carrying the cargo which they put in her, is to us utterly inconceivable, when at the very small expense, Mr. Merrifield tells me, not more than £20 to £25, they could have calculations made, which would show them to what depth they could safely load the vessel. I do think that there is great room for improvement in this respect.

"As, however, we have not been furnished, by those from whom we might have expected it, with those details which would have enabled us to calculate with tolerable accuracy the degree of stability possessed by this vessel, we must endeavour, with the assistance of Mr. Merrifield, to form the best estimate we can on the subject from the materials which we have before us. And first it will be observed, that this vessel had a beam of 33 feet as against a depth of hold of 22·4 feet, which gives a co-efficient of ·68. Now I confess that I was very much surprised to hear Mr. Dobson, Messrs. Mitchell's manager, say that a great many vessels were being built all over the country with 32 feet beam and 24 feet depth of hold, giving a co-efficient of ·75. I had lately to try a number of cases of a somewhat similar description to the present at Newcastle; amongst them the *Tiara*, the *Emblehope*, the *Lufra*, the *Prometheus*, and the *Joseph Ferens*, in which the proportion of depth to breadth varied from ·68 to ·76. And in nearly all those cases, so far from justifying the proportions of beam to depth, the parties gave as an excuse that the vessels had

been built some few years since (between 1874 and 1878), and that they had built them deep, long, and narrow, in the expectation that they would obtain great speed with the same carrying capacity. We were told, however, that this had proved to be a mistake, and that the vessels which they were now building had a much wider beam. All the vessels of which I am speaking were Tyne built ships, and I confess, therefore, that I was astonished to hear Mr. Dobson, who belongs to the same district, come before us and say that they were building all over the country vessels having a co-efficient of depth to beam of ·75."

The following passage from another of the reports is very striking:—

"Now the first thing that strikes us in this case is, that no one seems to have been responsible for the stability of this vessel. According to Mr. Campbell, the manager for the builders, they got an order to build a vessel which should be 300 feet long, 36 feet broad, and 25 feet deep, and which should be capable of carrying 3,200 tons of dead weight, with a freeboard of 5 feet, but as to whether the vessel when built would be a stable or an unstable vessel, whether she would be safe or unsafe to carry her cargo, that was a question with which they had nothing to do. Mr. Garbutt again tells us that until recently he has only been a land and house agent, and had had nothing to do with shipping; indeed, if we are to believe him, he knows knothing about shipping even now. He told us that the above dimensions were given to the builders on the advice of some friend, but he admitted that he had never calculated the stability of the vessel, and had never taken any measures to have it calculated by any one. He told us that during the building, he had been advised by Captain Fisher and Captain Fulham, the late master of the *Marlborough*. Captain Fulham, however, could hardly have been of much assistance to him in the building of the vessel, for Mr. Garbutt told us that he never knew him until about two months before he took the command. And as to Captain Fisher, all that we know is that he is at present in command of another ship of Mr. Garbutt's, a sister ship to the *Marlborough*, and that he is accustomed to load her down to 4 feet of the water's edge; if so,

Captain Fisher can hardly be a very safe adviser. But from first to last no one ever seems to have calculated the stability of the vessel, the position of her metacentre or of the centre of gravity, or with what amount of cargo and to what depth she could be safely loaded; all these were questions with which both the builders and the owner seemed to think that it was quite unnecessary to trouble themselves."

The report of the Court on the case of the *Marlborough* is as follows:—

"The Court, having carefully inquired into the circumstances of the above-mentioned shipping casualty, finds, for the reasons annexed:—

"1. That the load-line was not in a proper position on the ship's side, either at 4 feet, or even at 4 feet 6 inches below the upper deck.

"2. That, when the ship left on her last voyage, she was overladen.

"3. That, apart from all questions of overloading and of ventilation, the cargo was properly stowed and trimmed.

"4. That she was not properly or sufficiently manned.

"5. That looking to the form and dimensions of the vessel, the depth to which she was loaded, and the nature of the cargo which she had on board, she had not sufficient stability for a winter or for any voyage.

"6. That 4 feet was not a sufficient freeboard for a winter or for any voyage.

"7. That, in the opinion of the Court, her loss was probably due to her having been swamped or overturned.

"8. That the load-line was placed at 4 feet below the upper deck by the order and with the knowledge and sanction of the managing owner.

"9. That she was overladen with the knowledge and sanction of the managing owner.

"10. That she was under-manned with the knowledge and sanction of the managing owner.

"The Court accordingly condemns David Parkinson Garbutt, of Marlborough House, Anlaby Road, Kingston-upon-Hull, in the sum

of two hundred and fifty pounds (£250), nomine expensarum, £50 thereof to be applied towards the expenses of the Court, and £200 towards the expenses of the Board of Trade.

"Dated this 23rd day of March, 1880.

"(Signed) H. C. ROTHERY,
"Wreck Commissioner.

"We concur in the above report.

"(Signed) A. RONALDSON, ⎫
" C. Y. WARD, ⎬ Assessors.
" C. W. MERRIFIELD, ⎭

"The Merchant Shipping Acts, 1854 to 1876."

The *Marlborough* was a strong, well-built ship, built in 1878, in Sunderland. She was 301 feet long, 36 feet broad, and 25·4 feet deep. She had two iron decks, with a lower tier of beams, on which a deck was not laid. Her gross register tonnage was 2,308 tons, her net register 1,498, and her under-deck tonnage 2,149. She had two water-ballast tanks; the one forward of the engine-room was 76 feet long, the other, aft of the engine-room, was 92 feet long. She was classed 100 A1 as a three-decked ship.

The "Plimsoll" load-line was placed at four feet from the upper-deck; she was, however, loaded so that she had a freeboard of 3 feet 8 inches or 3 feet 9 inches, and she was laden with coal. It is very important that the above facts should be strictly borne in mind, as the judgment of the Court is a stern warning to Board of Trade officers as well as to shipowners, and the annex to the Report is a permanent guide to owners loading vessels of similar proportions with a similar cargo. The Wreck Commissioner informs us thereon as follows:—

"Now the load-line on the ship's side marks the point to which the owner claims a right to load her down, which right, I may observe, was, as we shall presently see, exercised by Mr. Garbutt without stint or scruple. But a freeboard of 4 feet gives on a depth of 25·3 feet something less than 2 inches to every foot of hold, an amount of freeboard which not one of the witnesses has been bold enough to come forward and say was sufficient. Mr. Campbell, the manager to the builders, told us that, although the

contract provided that she should be capable of carrying a dead weight of 3,200 tons upon a freeboard of 5 feet that did not mean that she should be loaded with safety down to 5 feet; in his opinion she ought not to have been loaded below 5 feet 6. Again, Captain Jennison, who acted as chief officer on the second and third voyages, told us that, in his opinion, she ought to have had a freeboard of from 5 feet to 5 feet 6, or at all events of 5 feet. And Captain Edgell, a gentleman of very large experience, both as a master mariner and as a surveyor of shipping, has told us that, in his opinion, she ought to have had a freeboard of not less than 6 feet in summer, and of 6½ feet in winter. I may add that according to the tables published by Mr. Rundell, the Secretary to the Liverpool Underwriters' Association, a gentleman whose opinion is entitled to the greatest consideration, she ought to have had a freeboard of not less than 7 feet 1½ inches."

"The next question, on which our opinion has been asked, is whether the vessel was overladen on her last voyage. It appears that on each occasion the vessel carried coals outwards, the first time from the Tyne, and the three last voyages from Cardiff. . . . The fourth and the last voyage commenced on the 29th of November last, and she then had 2,511 tons of cargo, and 859 tons of bunker coal, or a total of 3,370 tons. What was her draft of water and what her freeboard on this occasion does not appear to have been very correctly ascertained, for the loading was only finished at 8 p.m. of the 28th, and she left before daylight of the 29th: but according to the foreman coal trimmer the loading marks on her stern-post and stem, which were marked to 24 feet, were submerged before the loading was completed, and after it was completed, he and the captain went with a lantern to look for the load-line, but found that both it and the disc were below the water, and as the top of the disc would be 6 inches above the load-line, this would give her less than 3 feet 6 of freeboard. It is right, however, to state that at that time her ballast-tanks or some portion of them seem to have had water in them, a fresh engineer having just joined her, who had not had time to make himself acquainted with the pumping arrangements. She would, therefore, no doubt have risen somewhat after the tanks had been pumped out, and when

she had got into salt water, but how much it is impossible to say. Seeing, however, that she had on board on her last voyage about 30 tons more than on the second voyage, when according to the official log-book her freeboard was only 4 feet, and according to the chief officer the water was, on leaving the Roath Dock, two inches above the load-line; and that she had 120 tons more than on the third voyage, when the log-book states her freeboard to have been 4 feet 2, I think we may safely assume that on her last voyage she would, when she left the Roath Dock, have been sunk at least some 3 or 4 inches below the load-line, thus giving her a freeboard of only 3 feet 8 or 3 feet 9 inches, the vessel, we are told, sinking an inch for every 22 or 23 tons. . . . It may, perhaps, however, be said that the position of the load-line and the amount of freeboard which a vessel ought to have is after all a matter of opinion, and that no hard-and-fast rule can be laid down as to the proportion which should be allowed between the freeboard and the depth of hold. It may, therefore, be proper to see how the vessel appears to have behaved on some of her previous voyages when she was so deeply laden as we have seen her to have been.

"As to how she behaved on going out on her first voyage, we have no knowledge, no witness having been produced who could speak to it. It seems, however, that she returned from New York with a full general cargo, 'every available inch of space having,' according to the master's letter of the 19th of March, 1879, 'been utilized,' and that she then drew 21 feet 5 forward, and 22 feet 6 inches aft, or a mean of 21 feet 11½, giving her a freeboard of 5 feet 7 inches. Thus loaded she left New York, but meeting with bad weather, she got a list, and had to run to port to restow her cargo. On her return to this country a protest was made, which has been brought in, and on examining it, we find that even with a freeboard of 5 feet 7, which she then had, she was anything but a safe boat. Day after day we find expressions of this kind, 'at times she completely buried herself in the sea,' 'the ship completely filling herself with water,' 'vessel completely buried herself at times, constantly filling her decks,' 'took immense quantities of water on deck and over all,' 'took much water on

deck,' 'vessel rolled as before, taking in an immense quantity of water on deck.' It is one continued account of shipping heavy seas, and filling her decks with water. But if this was her behaviour when she had a freeboard of 5 feet 7, it is important to see what it was on the second and third voyages, when she had a freeboard of only 4 feet, or thereabouts. This we are fortunately able to do, seeing that the first and second officers of the vessel on both those voyages have been examined before us, and as they are all of them gentlemen of large experience, and all hold master's certificates of competency, we can place implicit reliance on their evidence, the more so, as they appear to entertain no ill-feeling against the owner.

"The first of these witnesses is Captain Jennison, who was chief officer of the vessel on both the second and the third voyages. According to this gentleman, although they had fine weather out on the second voyage, the vessel 'behaved very badly, she was very tender, her decks were always full of water, and she did not seem as if she could get clear of it; she lay with her lee bulwarks down all the time, and had a list to port.' Again, on the third voyage he says she behaved very badly, although they had not so much wind. He also told us that he had informed Mr. Pauling, Mr. Garbutt's cashier, that 'she wouldn't stand upright,' that 'she was always on her broadside,' and that he thought 'she would founder.' He added that he thought she was 'a ship to turn over on her broadside, for that, as 'soon as any wind came, she would go down and take a list.' That is the opinion of Captain Jennison, a thoroughly competent witness, and one who showed himself to be anything but unfavourably disposed to the owner.

"The next witness is Captain Mellor, who served in her as second officer on the second voyage. He told us that the vessel 'behaved very badly on that voyage,' that 'she shipped a great deal of water,' and that 'when she got water on her decks she took a list,' that it lay there and 'could not get off,' and that 'if she shipped one sea she generally shipped two or three more,' and that in his opinion she was not 'a safe ship.' He added that 'she was a very tender ship, and when loaded had a tendency to capsize,' that 'she took a permanent list in very moderate

weather, in weather such as in a very small ship we should be carrying all sail.' This gentleman told us that he had had enough of her after one voyage, and left her at the termination of it in company with the whole of the crew except the master and chief officer.

"The next witness is Captain Lamplough, who acted as second officer on the third voyage. He told us that 'they had a fresh breeze crossing the bay,' and that 'they had fine weather after that;' but that nevertheless, the vessel took 'lots of water aboard, filled her decks, her load-line being at four feet,' and that 'she was not a good sea boat.' He added, 'I had been long enough in her with one voyage, and we left her right through the ship except the master.' In fact, every one seemed to have had quite enough of her after one voyage.

"In addition to the above we were told by Mr. Blakeney, Mr. Garbutt's manager, that the men, when they left, complained 'that she was a very tender ship, and that 'she lay down and wallowed like a pig and couldn't get up.' In fact, the evidence is uncontradicted that, when the vessel was deeply laden, as she was on several of these voyages, she was a bad sea boat, was continually shipping heavy seas, taking a list, and lying over on her side. On the other hand, they all concur in saying that, when in ballast, or with a light cargo, she was a good sea boat and behaved very well. Thus, when she was returning from Galveston with cotton on her third voyage, and when according to the official log book her draft of water was 18 feet forward and 20 feet aft, giving a mean of 19 feet, and when, consequently, she had a freeboard of 8 feet 6½ inches, Captain Jennison tells us that she behaved very well. All these facts tend strongly to confirm Captain Edgell's evidence that she ought not to have had a freeboard of less than 6 feet in summer and 6 feet 6 inches in winter, and that when she left Cardiff on her last voyage she was dangerously overladen."

There was a very serious allegation of under-manning, and the Court found the owner to blame on that point too, but out of consideration for what must now be the feelings of the owner, we refrain from reproducing that part of the annex to the Report. The tale told by the letter of the dead master has, we hope, no equal.

The report in the *Kensington* case is as follows:—

"The Court, having carefully inquired into the circumstances of the above-mentioned shipping casualty, finds, for the reasons annexed:—

"1. That the load-line was not placed in a proper position on the ship's side.

"2. That when the ship left on her last voyage she was overladen.

"3. That, apart from the quantity on board, and the question of ventilation, the cargo was properly stowed and trimmed, the vessel being on an even keel.

"4. That the means of ventilation were not sufficient, nor were they properly placed, having regard to the nature of the cargo which she had on board.

"5. That, looking to the form and dimensions of the ship, the depth to which she was loaded, and the nature of the cargo which she had on board, she had not sufficient stability for a winter or for any voyage.

"6. That the load-line was placed where it was by the order of the owners' agents, and with the knowledge and sanction of the owners.

"7. That she was overladen with the knowledge and sanction of the owners or their agents.

"8. That, in the opinion of the Court, the loss or supposed loss of the vessel is probably due either to her having been swamped or overturned, owing to insufficient stability, or to an explosion of coal gas on board.

"The Court makes no order as to costs.

"Dated this 25th day of March, 1880.

"(Signed) H. C. ROTHERY,
"Wreck Commissioner.

"We concur in the above report.

"(Signed) C. Y. WARD,
" A. RONALDSON,
" C. W. MERRIFIELD,
Assessors."

The *Kensington* was a strong, well-built ship, built on the Tyne 1878. She was 240 feet long, 33 feet broad, and 22·4 feet

deep. She had two iron decks with a lower tier of beams. Her gross register tonnage was 1,401, her net register, 908, and her under deck tonnage, 1,401. She had two water ballast tanks; one in the engine-room, 40 feet long, and one in the after-hold, 60 feet long. She was classed 100 A1. The "Plimsoll" load-line was placed at four feet from the upper deck, by Mr. Walton, the owner's superintending engineer. She was coal-laden, and had a clear side of 4 feet 6 inches. So that in this case she was not even loaded down to the disc.

We gather the following from the annex to the report:—

"Now the first question upon which our opinion has been asked is, 'whether the disc or load-line was placed in a proper position on the ship's side?' It seems to have been put at 4 feet from the deck, and as the total depth at the side was 24 feet, the vessel would, if loaded down to her load-line, have been drawing just 20 feet. The gentleman who ordered the load-line to be placed in this position was Mr. Walton, Messrs. Watts, Ward and Company's superintending engineer, who told us that he ordered it to be done after consultation with a Captain Marshall, a master mariner, who had been specially appointed by the owners to superintend the building and equipping of this ship. And the ground which these gentlemen gave for putting it there was because they considered that 2¼ inches per foot of depth of hold was a proper allowance. In this opinion, too, they were confirmed by Mr. Tate, Messrs. Mitchell's draughtsman, as well as by Mr. Dobson, their manager, although the latter stated that in his opinion it would be the extreme limit. But none of these gentlemen could give us any reason for the load-line being placed at 4 feet, except that in their opinion 2¼ inches per foot was a sufficient allowance; they had never made any calculation as to the depth to which the vessel might be safely laden, which is, after all, the meaning of the load-line; it was with them a mere question of rule of thumb. I may add, too, that 2¼ inches on a depth of hold of 22 feet 4 would not give 4 feet, but 4 feet 2½ inches; so that, even if their estimate of 2¼ inches was correct, they were in error in putting the load-line at 4 feet; and, according to Mr. Dobson, 2¼ inches being the extreme limit, 4 feet was obviously an improper place at

which to put the load-line. Turning, however, to the other evidence in the case, we have first a Captain Laing, who was produced on behalf of the owner to prove that 4 feet was the proper place to put the load-line. This gentleman, however, after saying that in his opinion 2¼ inches would be a proper allowance, when pressed on the point, stated that for his part he should have allowed 2½ inches, which would have put the load-line at 4 feet 8 inches. On the other hand, Captain Edgell, a gentleman of high character and of large experience, both as a master and as a surveyor, said that he should have given her 2¾ inches for the summer and 3 inches for the winter, which would be 5 feet 1½ inches for the summer and 5 feet 7 for the winter, or, speaking generally, 5 feet for the summer, 5 feet 6 for the winter. To this I would add that, according to the tables published by Mr. Martell, a gentleman of very great authority on matters of this kind, this vessel ought not to have had a less freeboard than 5 feet 1½, and according to Mr. Rundell, the Secretary to the Liverpool Underwriters' Association, she should have had a freeboard of 5 feet 8 to 5 feet 9. Taking then the evidence of the witnesses who are most favourable to the owners, the load-line was at least 2½ inches too high; according to the evidence of Captain Laing, it was 8 inches too high; and according to the evidence of Captain Edgell it was a foot or more too high. The only conclusion then, to which we can come is, that the load-line was not put in a proper position on the ship's side.

"The second question, upon which our opinion is asked, is 'Whether the vessel was overladen?' It was stated that on her last voyage the vessel had 1,533 tons of coal as cargo, that they put into the permanent bunkers 139 tons in addition to 40 tons which were there before, and that there were 326 tons of reserve bunker coal put on board, making a total of 2,038 tons. We are also told that on leaving Garston Dock she drew 19 feet 6 upon an even keel, which would put the load-line just 6 inches out of the water, the total depth at side being, as I have said, 24 feet.

"Taking then her draught to have been 19 feet 6, and her freeboard consequently 4 feet 6, when she left Garston Dock was she

overladen? If we take Captain Edgell's statement that she should have had 5 feet 6 freeboard, this being a winter voyage on Mr. Martell's or Mr. Rundell's tables, it is clear that she was very much overladen. Even according to Captain Laing she was deeper than he would have put her. Not, indeed, that she was overladen to the extent to which the *Marlborough* was, but she was deeper than, in the opinion of competent and experienced persons, she should have been."

As regards ventilation, the "annex" concludes:—

"It is obvious, therefore, that the gas, which might be given off, not only from the lower fore hold, but also a great deal of that from the main 'tween-decks, would accumulate in the empty space left in the fore 'tween-decks, and that from there there would be no escape for it. We are unable therefore to say that the means provided for the ventilation of the holds were sufficient . . . .

"Lastly, we are asked, 'What, in the opinion of the Court, was the probable cause of the loss or supposed loss of this vessel?' Taking into consideration the narrow margin of stability which this vessel appears to have had, and the fact that she was sent to sea too deeply laden and with too low a freeboard, more especially for a winter voyage across the Atlantic, it is quite possible that she might have been either swamped or overturned. Or again, it is possible that she may have been destroyed by an explosion of coal gas, for it appears that on clearing up the decks before leaving port they put all the spare rope and other articles into the fore 'tween-decks, where, as we have already shown, gas would readily accumulate, and for which there was no escape; and if a man had been sent down there to get a piece of rope and had taken with him a light, it is but too probable that an explosion would have occurred. Either of these causes, then, might have occasioned the loss of the ship, but which of them it is not possibly for us to say, nor whether or not it was due to any or what other cause."

The following remarks were made *apropos* of an application for costs:—

"After we had given our opinion on the questions which had been asked, counsel for the Board of Trade applied for costs against the owners. It appeared to us, however, that this was a

very different case to that of the *Marlborough*, in which we had recently given costs. In the first place the *Marlborough*, although about two-thirds as large again as the *Kensington*, had had her load-line marked at the same place on the ship's side, namely, at 4 feet below the deck. Again, the *Marlborough's* load-line, which had first been placed at 4 feet 6 inches, was afterwards raised 6 inches by the owners' express directions. Whilst, too, the *Kensington* was loaded so as to have her load-line 6 inches out of the water, the *Marlborough* was sunk down, so that the water was up to and even above the load-line. Taking all these facts into consideration, seeing too that there is no charge against the owners of the *Kensington* of having sent the ship to sea undermanned, and believing that they have acted throughout bonâ fide, and have erred rather from want of knowledge than from want of care, or from a grasping desire to secure larger gains at the risk of the lives of those on board, we do not think that it is a case in which we ought to condemn the owners in costs.

"(Signed) H. C. ROTHERY,

"Wreck Commissioner.

"We concur.

"(Signed) C. Y. WARD,
" A. RONALDSON,
" C. W. MERRIFIELD, } Assessors."

Having given above the prominent points in these cases, we think we may fairly ask whether before, or indeed instead of the Tonnage Laws of the whole world being altered, as Mr. Martell would wish, in order that shipowners may be induced to allow a greater freeboard in certain cases by shifting taxation on to other ships, it might not be well to try a more obvious and less round-about remedy. For instance, would it not be well for the Register Societies to require owners to deposit with them calculations and curves of stability of ships about to be classed. This would effect a twofold purpose. It would "educate the party" of shipowners, ship's husbands, and shipbuilders who are, or profess to be, at present, ignorant of one of the elementary principles on which their business is carried on, while it would inform the societies of

a series of important facts. It would also be the means of placing in the hands of the Wreck Commissioner, trustworthy records in the event of the disappearance of a ship.

There is a society called "The Chamber of Shipping of the United Kingdom;" a society which usefully occupies itself with questions affecting ships. We have noticed from the reports of the proceedings of that Society, that its members take great interest in making attempts to get rid of the payment of light dues by shifting the burthen on to the great body of taxpayers; in attempts to abolish certain shipping and discharge fees; in concerted opposition against the proposal of Mr. Plimsoll that grain cargoes shall be carried in bags; but we have not noticed that they have as yet taken any steps with the view of mutual agreement or concerted action in such matters as overloading, undermanning, food scales, health of crews, &c., &c. We have, however, no doubt that they will do so. If they do, the result will be of first-class importance. It is through neglect of action on these questions and subjects by such a competent body as the Chamber of Shipping, that Mr. Plimsoll's agitation is regarded by the multitude as a necessary protection to "our seamen."

These excellent reports of the Wreck Commissioner in the cases of the *Marlborough* and *Kensington* will, we believe, do more good than sessions of legislation. It is by publication of statements of facts such as he has so ably made that continued and systematic disregard to common means of safety will become impossible.

We would, in conclusion, call the attention of our readers to a letter in this month's issue, signed "ONYX," from a trustworthy and accomplished practical sailor.

very different case t
recently given costs.
about two-thirds as
load-line marked at
4 feet below the dec
had first been placed
inches by the own
Kensington was load
the water, the *Marl*
up to and even abov
consideration, seeing
of the *Kensington* of
believing that they
erred rather from wa
from a grasping des
lives of those on boa
we ought to condem

"We concur.

"(

Having given abo
think we may fairly
Tonnage Laws of the
would wish, in order
greater freeboard in e
ships, it might not be we
about remedy. For insta
Societies to require owner
shaves of stability of ships
twofold purpose. It woul
s husbands, and shipbu
cheat, ignorant of one of th
nt free business is carried on, whi
w. Ever
ilors of lo

ably dire experience of one or more of the
earsay knowledge of the others.
ot one evil which may always, and often un-
xist together with any or all of the above
? and which lies at the bottom of all, and may
two words, "improper loading." To load a
weak vessel, or a very old vessel with a heavy
would be improper loading. To load a deep and
a full cargo of equal specific gravity throughout,
sufficient ballast below it, would be improper
s so liable to shift, that it runs almost like water,
l cargo of it in bulk, without giving extra care
towage, and without taking extreme precautions
sel with every appliance needful to prevent its
per loading. To load a vessel so deep that her
pare buoyancy are reduced to a minimum, so that
to the seas, and they fall on board with a force
as no ordinary hatches or sky-lights can resist,
ng. To load a vessel with coal of an explosive
means or appliances for its efficient ventilation,
ling. To stow a vessel's cargo so that it gets
the crew are worn out by continually securing
, thereby neglecting other duties necessary for
, is also improper loading. Much nonsense has
it water-ballast tanks, and I am glad to see that
nted this out in his paper read at the Naval Archi-
If a vessel is built with water-ballast tanks, it is done
saving when shifting port, and the raising of the
ntage with heavy dead-weight cargoes, whilst with
cargo there is convenience in stowage and less
ured. If when the ship has to carry what are called
cargoes (if I may coin a word I would call them
is discovered that the ship is tender and requires
ould be provided. If this is not done it is improper
ears and years before water ballast was thought of
crank ships and homobaric cargoes, such as tea, rice,
, &c., with all of which ships required more or less

FOUNDERING: ITS CHIEF CAUSE.

(*Communicated.*)

PUBLIC attention has of late been aroused in an unmistakable way to the disastrous total losses of ships in the open ocean: nor is the interest likely to slacken so long as these losses recur with such alarming frequency. Very probably the new Parliament will before long be engaged in attempts at legislation in this direction, and every one, possessing any special knowledge on the subject, should render what aid he can to throw light on it. With this object I desire to point out that, whilst on all sides there is an undoubtedly earnest desire to put a stop to this wholesale loss of life and property, yet so numerous and various are opinions as to the cause and as to the methods for removing it, that it seems not unlikely, that in the multitude of counsellors, we shall not have wisdom but confusion.

I propose to endeavour to show that, underlying almost every suggested cause, there is one general one which applies to all, and that if that one did not exist, the others would not be such important elements of danger.

I shall not fill your space by attempting to give statistics of the number and size of the vessels lost, nor of the description of their cargoes. That information has already been supplied in the pages of the *Nautical*, and of several other periodicals and public documents. Sufficient for my purpose is it to enumerate some of the various causes to which, so far as I can ascertain, their disasters have been attributed. We have, 1st. Faulty material in construction of ship, or weakness from age or other cause. 2nd. Faulty shape of the vessel. 3rd. Insufficient steam-power. 4th. Water-ballast tanks. 5th. Grain cargoes carried in bulk. 6th. Insecure hatches, skylights, &c. 7th. Explosion of cargoes. 8th. Insufficient freeboard and spare buoyancy. 9th. Insufficient or inefficient crew. Every one of the above have I heard described, by different sailors of long experience, as the main cause of the recent losses.

Each having probably dire experience of one or more of the number and only hearsay knowledge of the others.

Now, is there not one evil which may always, and often undoubtedly does, exist together with any or all of the above enumerated causes? and which lies at the bottom of all, and may be summed up in two words, "improper loading." To load a naturally slight or weak vessel, or a very old vessel with a heavy cargo of pig-iron would be improper loading. To load a deep and tender ship with a full cargo of equal specific gravity throughout, without placing sufficient ballast below it, would be improper loading. Grain is so liable to shift, that it runs almost like water, and to load a full cargo of it in bulk, without giving extra care and time to the stowage, and without taking extreme precautions in fitting the vessel with every appliance needful to prevent its shifting, is improper loading. To load a vessel so deep that her freeboard and spare buoyancy are reduced to a minimum, so that she cannot rise to the seas, and they fall on board with a force and volume such as no ordinary hatches or sky-lights can resist, is improper loading. To load a vessel with coal of an explosive nature, without means or appliances for its efficient ventilation, is improper loading. To stow a vessel's cargo so that it gets adrift, and thus the crew are worn out by continually securing and trimming it, thereby neglecting other duties necessary for the ship's safety, is also improper loading. Much nonsense has been talked about water-ballast tanks, and I am glad to see that Mr. Martell pointed this out in his paper read at the Naval Architects' meeting. If a vessel is built with water-ballast tanks, it is done because it is a saving when shifting port, and the raising of the cargo is an advantage with heavy dead-weight cargoes, whilst with a general mixed cargo there is convenience in stowage and less dunnage required. If when the ship has to carry what are called homogeneous cargoes (if I may coin a word I would call them homobaric) it is discovered that the ship is tender and requires ballast, it should be provided. If this is not done it is improper stowage. Years and years before water ballast was thought of there were crank ships and homobaric cargoes, such as tea, rice, cotton, &c., &c., with all of which ships required more or less

ballast, and the less ballast the more profitable the ship; but no one thought of going without it, at the risk of the vessel being dangerously crank at sea. Why should it be done now? So it is with the spare buoyancy and freeboard of a vessel. Never till of late years have ships been loaded so that in an ordinary gale the decks would be always under water. The mere necessity for the crew to move about the decks to work the sails would have prevented that, to say nothing of the fact that wooden ships would not have borne the weight of such cargoes, such as the great strength of iron ships now enables them to carry, more particularly when not shallow built. The vessels which were looked upon as the finest merchant ships afloat (I mean the fine frigate-built East Indiamen) would not have lived out their first gale, had they been laden as vessels are now. To talk of the construction or the type of modern vessels as the cause of their foundering is to raise a side issue distracting attention from the main one. Great has been the outcry against long vessels; my experience is that the long vessels are the easiest at sea when not improperly loaded. Insufficient steam-power is unquestionably a source of danger when a vessel is running, but it becomes infinitely more so when she is like a half-tide rock, and consequently so sluggish that it is difficult to move her. There is, however, one type of modern vessel which though doubtless safe when not improperly loaded, yet I think ought to have more freeboard, and should not be laden with such heavy cargoes as flush deck vessels, I refer to the so-called well-decked ships. Not only are they more dangerous from the fact that a sea once on board cannot so easily be got rid of, but the nature of her construction in two halves, as it were, lessens her longitudinal strength, and in my opinion to load a well-decked ship as deep as a flush one is improper loading. Although grain in bulk is by its nature a dangerous cargo, we know that many vessels have constantly so carried it in safety; but if all vessels were compelled to go to the expense necessary to provide appliances, and to incur the loss of time and expense of stowage needful to render their full bulk cargoes secure from shifting, I venture to think that owners would soon find that the carrying the grain in bags would be the cheaper method.

Now, if improper loading lies at the bottom of all the trouble, how many different opinions shall we not get as to the measures to be taken for preventing it? I for one am inclined to say, take none, at least not in an overt way. But, if on proper investigation a vessel is proved to have been lost from improper loading then let the blame be brought home to the authors of it, and let there be no mistake as to who the authors are. Don't make a scapegoat of some poor wretch of a master who has only been carrying out the instructions, either direct or implied of the owner. If the owner desires not to have his ship improperly loaded, depend upon it he will take as much pains to find the master who will not do it, as he now does to get the man who will carry the largest cargo, at the risk of his life and regardless of consequences.

It is as easy to calculate the stability of a vessel with a homobaric cargo, as it is to calculate her displacement, and the difference of opinion as to what should be the minimum percentage of spare buoyancy and freeboard is not so great but that some standard might be fixed by the Board of Trade and the Underwriters. At any rate it could not fail to be in excess of 10 per cent. spare buoyancy, or 1¼ inch to the foot of hold for freeboard, with which small margin of safety many vessels are now sent to sea.

ONYX.

OFFICIAL INQUIRIES.—COMPASSES.

FROM some recent decisions of the magistrates and their assessors with reference to the magnetic courses steered by iron ships, it would appear to be necessary that they should have before them, when considering their judgment in cases of inquiry, a simple and plain statement as to the compass deviation of iron ships and the usual method of tentative compass adjustment as practised in the Mercantile Marine.

The magnetic character of an iron ship is represented by five coefficients :—

A. Constant deviation.

B. }
C. } Semicircular deviation.

D. }
E. } Quadrantal deviation.

Besides these there is another error which in some ships is very considerable, viz., the heeling error.

As the coefficient A is a constant and is generally very small, it is not for the present purpose necessary to enlarge upon it.

B and C are two coefficients representing the semicircular deviation, so called because it is easterly in one semicircle and westerly in the other. It consists of two parts, the induced magnetism, caused by vertical induction in soft iron, which varies as the tangent of the dip, or as it is sometimes called the magnetic latitude, and the permanent magnetism which varies inversely as the earth's horizontal force at the place.

If the exact proportions of these two parts were accurately known and remained unchanged, the alteration in the semicircular deviation might be calculated for a change of magnetic latitude, but this is not the case.

For convenience, the semicircular deviation is arbitrarily divided into two parts, represented by B and C.

B represents the fore-and-aft magnetic forces of the ship, with its zero deviation when the ship's head is N. and S.; its maximum when the ship's head is E. and W.

It is corrected by the compass adjuster by placing a magnet or magnets in a fore-and-aft line, with their centres in a tranverse line with the centre of the compass.

C, which has its zero E. and W., maximum N. and S., is corrected by placing magnets athwartships, either forward or abaft the compass or both, with their centres in the same fore-and-aft line as the centre of the compass.

D and E are co-efficients, representing the quadrantal deviation, caused by horizontal induction in soft iron, and when properly corrected by soft iron placed on the same level as the compass needle, remain correct for all latitudes.

The heeling error when large, is compensated by a magnet placed vertically under the centre of the compass and is only correct for one latitude.

The object of this paper is to impress on magistrates and assessors that as the semicircular and heeling deviations alter with the position of the ship on the earth's surface, that the deviation table supplied by the compass adjuster is only correct for the place where the ship was swung, and that the responsibility rests with the master to ascertain the change in the deviation of his compass by constant observation of heavenly bodies, both day and night,* when the weather permits.

Further, that if the ship be swung and her compasses corrected by magnets in the northern hemisphere, that it will generally be necessary in high southern latitudes to reverse the poles of the fore-and-aft magnets, correcting coefficient B; that the (vertical) heeling magnet will require constant attention and alteration of position as the ship alters her latitude, and in high southern latitudes it will probably be necessary to reverse its poles.

ENGINEER SURVEYORSHIPS.—We understand that the Board of Trade are about to appoint two Engineer Surveyors of the third class at yearly salaries of £200, rising, by annual increments of £10, to £300, with chances of promotion to the higher classes. The limits of age are 25 and 45, and candidates must have served at sea in charge of engines, and hold Board of Trade 1st class certificates of competency as engineers. Intending candidates should make early application to the Assistant-Secretary, Marine Department, Board of Trade, London, S.W., for the necessary "Forms of Application for Appointment," and for information as to the prescribed examination, &c., &c. Applicants will have to undergo an examination before they are appointed.

---

* [In the introduction to Burdwood's tables will be found a table of bright stars, which, in addition to the moon and planets, are available for azimuths, and in Towson's work "Practical information on the deviation of the compass" will be found the bearing of Polaris for each hour of sidereal time.—ED.]

CORRESPONDENCE.

REPRESENTATION OF OUR SEAMEN IN PARLIAMENT.

To the Editor of the "Nautical Magazine."

Sir,—Perhaps this is not an inappropriate time to call atter tion, through your columns, to the large number of men in th Merchant Service who, although they are such an important bod in the country, as to make it necessary to legislate specially fo them, still have no voice in the election of those legislators. I a speaking of the large number of men who are not householders their only houses being the house on deck or the forecastl and who are not on shore sufficiently long to be entitled t votes as lodgers, their stay being on an average about eight week in twelve months.

Now although they spend the greater part of their lives on th Great Highway, still their ship is a part of England, and the law of England govern them the same as they do people on shore but the ship is more than simply a part of England. She i nothing less than an English village with houses, shops, or rathe one shop, and shopkeeper, householders as well; a compl villago, if a small one, and everyone living in this village has t pay rent for doing so, not in money but in money's worth (labour) No one supposes that because a seamen has his provision serve out to him without his actually handing over hard cash for it th he gets it for nothing—he buys it with labour; and the place h lives in is obtained on exactly the same terms. He pays his re the same as a man on shore.

His position is just that of a man living in a house belonging t his employer—rent free; but the owner of the house, as a rul takes the rent in the shape of work, and so does the shipowner.

Any man on shore who received the same pay as an A.B., a at the same time sufficient money to pay for the provisions usual served out to an A.B., and lodging money in proportion also, wo be in a much better position than a large number of mechanic but because he does not pay rent, or lodging money, he is shut o from having any voice in the government of his count Educationally he is quite as competent to vote as thousands of t

working classes, and the officers, to whom all the foregoing applies in a much greater degree than to the A.B., are, as a rule, just as able as any class in the country, and they number several hundreds.

It has always seemed a curious thing to me that although the shipowner, according to a great many people, is always trying to murder us for gain, still we are not allowed to look after ourselves a little, but must be treated like infants.

We ought to have a vote. Yes, more than a vote; we ought to have a member to look after our particular interests and then we should have someone who understood our wants, and not be dependent on people whose only experience of sea life is Battersea life, and their only knowledge of a ship the penny boat that takes them there.

I am, Sir, your obedient servant,
A SEAMAN WITHOUT A VOTE.

Southampton, April 7, 1880.

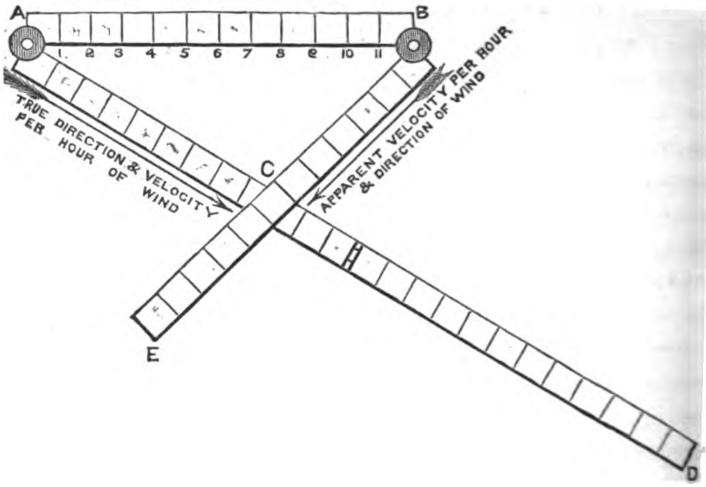
APPARENT AND TRUE DIRECTION OF WIND WHEN SAILING.

To the Editor of the "Nautical Magazine."

Sir,—I am very much obliged to you that you admitted my note into your March number.

I see in the April number of your esteemed journal a paper "On the Apparent and True Direction of the Wind when Sailing." Long ago I proposed a small apparatus for finding mechanically, as the author does by reckoning and by a table, the true direction and force of the wind, and I have given it to some of our ships for application.

Take a four-foot rule with flat hinges as shown at A and B. Let A B represent the velocity per hour of the ship, say 12 knots, turn the rule B E in the line of the apparent direction of the wind, and then mark off at C the apparent velocity in knots per hour, say six, then apply the double length rule A D so that it crosses the rule B E at C, A C will then represent approximately the force and the velocity of the wind, and B A C the angle of its true direction with the course of the ship.



It was especially desirable to reduce in this manner the apparent direction on board of steam vessels.

I should be greatly obliged if any of your subscribers would assist me to procure some reliable observations concerning the winds in the Red Sea and the Indian Ocean which are traversed by some steamers at nearly the same periods in one or the other direction.—I have the honour to be, &c.,

Utrecht, 5th April, 1880. BUYS BALLOT.

GRAIN LADEN SHIPS FROM UNITED STATES' AND CANADIAN PORTS.

To the Editor of the "Nautical Magazine."

Sir,—I beg you will afford me space in your next issue for a few remarks upon the tabular statement of vessels lost from United States' ports compared with those from Montreal, as furnished by Mr. W. J. Patterson, Secretary of Montreal Board of Trade.

He says that from 1878 to 1879 not a single vessel has been lost through cargo shifting. This is satisfactory, and it is only fair to accept his statement as correct, as no doubt it is the result of careful investigation. But the statement marked "F," giving the losses of vessels from United States' ports, seems to me very unfair and misleading, and it is this I wish to correct.

It appears to me that to draw a fair comparison between

Montreal and United States' ports, the losses in the same months should be used in both cases, not the winter months from United States and summer months from Montreal. It must be remembered that the St. Lawrence is frozen up from, say, November till May, the worst times of the year, and no grain is shipped between these months, so that the freedom from losses enjoyed by Montreal cannot serve to show it is owing to the system of loading, but chiefly because the vessels cross the Atlantic mostly during the summer months, and I venture to say if grain was shipped during the winter from Montreal, there would be as many losses as from United States' ports, in proportion, of course, to the amount of tonnage leaving either place. It must also be remembered that vessels from Montreal have the advantage of nearly five days' steaming in comparatively smooth water until clear of the Gulf of St. Lawrence, while those from United States have to cross the most dangerous portion of the Gulf Stream.

Condensing statement "F," the losses in each month, according to that, would be as follows :—

1878.	September	... 6	
	October	... 7	
	November	... 2	Montreal navigation closed.
	December	... 8	
1879.	January	... 7	
	February	... 8	
	March	... 1	
	April	... 1	
	May	... 1	
	June	... 0	

I have loaded grain both at Montreal and the different United States' ports, and most certainly give the former the credit of exercising more care and watchfulness over the loading of cargoes. But the system used there is to a great extent now adopted in United States' ports, yet vessels still shift their cargoes and founder, and I fear if Montreal were able to ship grain during the winter, the losses from the latter port would be equally heavy as those from the United States.—Yours truly,

Newcastle, April 15th, 1880. WM. M. YOUNG.

BOOKS RECEIVED.

Annual Report of the Supervising Surgeon-General of the Marine-Hospital Service of the United States, **for the fiscal years 1878 and 1879. Washington.**

Before us lies a parcel of books from the United States, and, looking at them, we come to the conclusion that the Americans are a wonderful people in the issuing of "Reports." But there, whether it is to further the progress of science or art, to spread knowledge, to aid literature, to develop the resources of the country, or to make suitable provision for those who become disabled from sickness or injury while engaged in the line of duty, Congress is ever ready to untie its purse-strings, and the money required for the service is voted without stint. But there must be an "Annual Report," and this generally ranges over everything directly and indirectly connected with the subject to be reported upon, with statistics if necessary, a good account of the money already disbursed, and a reasonable basis of expenditure for a prospective grant.

The Report before us is as voluminous as usual, and is full of valuable "statements" and "notes" on various medical subjects, with special remarks on the yellow fever and the characteristics of the infected districts. Where possible, an examination has been made to test the colour capacity of individuals. Dr. Jeffries states that out of 11,735 men and boys he found 488, or 4·15 per cent., colour blind; out of 10,695 women and girls he found only six. In his opinion the difference is inherent in sex, and has nothing to do with training. But the most remarkable part of the Report is that relating to the "physical examination of seamen," and the "boarding-house" system as developed in the States. The following extracts will indicate the state of things in American seaports, and are sufficiently shocking in their revelations to require no further comment:—

"The several reports of this Service have more or less fully set

forth the reasons in favour of the enactment of a law for the compulsory physical examination of seamen before shipment by the commissioners under the law of 1872, and in furtherance of that end it was decided to make an actual trial of the system before asking that such a law should be formally incorporated among the statutes. Accordingly, on June 11, 1879, with the approval of the Secretary of the Treasury, a circular was issued to medical officers directing them to gratuitously examine any seaman brought for that purpose. In this connection it is proper to state that, while the objects of the circular have been approved by the medical profession, the United States Shipping Commissioners, the Philadelphia Board of Trade, the Shipowners' Association, the National Board of Steam Navigation, the Maritime Exchange of Philadelphia, and shipping associations generally, the sailors' boarding-house keepers, disreputable owners and ship-masters, have usually opposed the examinations. On this head, Captain Duncan, the United States Shipping Commissioner for the Port of New York, writes :—

"'My officers call the attention of all out-going captains, when opening their articles, to the desirability of such examination, and the facilities for it offered by the Government. A large proportion of captains heartily approve of the system, and promptly declare their intention of adopting it; but most of them quite as promptly ignore it when their crews are shipped.

"'The reason is, as I predicted, the "blood-money;" landlords will pay more to captains or owners for the privilege of filling their crew-lists without than with examination, and a little money of this kind, unlawfully extorted from seamen seeking employment, seems of more consequence than the physical condition of their seamen.'

"An investigation of this subject, shows that the people receiving the money are the class of owners and ship-masters above referred to. Should a boarding-house keeper fail to pay 'blood-money,' his boarders are not shipped; and as a natural result nearly all this class of men act *per force* as middle-men in this nefarious business. A severe penalty visited upon all persons convicted of paying or receiving 'blood-money' would relieve sailors

of an onerous tax, and take away the incentive to the opposition now shown by the 'blood-money' takers. It is not known how large a number of sailors are actually unseaworthy; but it is known that at least forty per cent. of all seamen are affected with venereal disease in some one of its protean forms. This is especially true of employés in the cook's and steward's departments of the passenger steamboats. Of the benefits to commerce that would be insured by a physical examination of the crews, other officers have told in former reports. The physical examination of seamen, and a local registration of the abandoned women on shore, would do for *syphilis* what the inforced introduction of lime-juice has done for scurvy, practically eliminate it from the list of diseases to which sailors are liable.

The method of entrapping Jack is easy enough.

"When a deep-water ship arrives in the harbour from a voyage, she is met at the entrance by 'runners' in skiffs—sometimes as many as twenty or thirty. They fasten on to the vessel, and if the captain will not allow them to board, he, at least, tows them into the dock—in fact, scarcely dares refuse. Any seaman having shipped from a house represented by any one of these 'runners' is instantly recognized and a card is offered him, which Jack willingly or unwillingly accepts. Once accepted, the 'runner' knows his man is safe and gives himself no further concern about him, but sends his luggage to the house as speedily as possible and lures Jack on to that round of dissipation which has been proverbial. When his money is exhausted, if his dissipation has so disabled him as to render him unable to ship, the sailor is sent to the hospital, but his relentless vampire never loses sight of him. As soon as convalescent he again becomes an inmate of the house until he has boarded out his 'advanced money.' When this has been secured the 'boarding master' condescends to allow Jack to ship; but when the vessel returns, woe be to the sailor if he accepts the card of a rival runner and thus changes his boarding master. No system of slavery was ever more exacting, for slaves are usually fairly clothed, but the sailor rarely saves enough from the rapacious hands of the 'boarding master' to clothe himself with ordinary decency."

(1) *Annual Report of the Lighthouse Board to the Secretary of the Treasury* for the fiscal year ending June, 1879. Washington.

(2) *List of Lighthouses, Lighted Beacons, and Floating Lights on the Atlantic, Gulf, and Pacific Coasts of the United States,* corrected to January 1, 1880. Washington.

(3) *List of Beacons, Buoys, Stakes, and other Day-Marks in the fifteen Lighthouse Districts of the United States.* Washington.

The Lighthouse Board of the United States, organized in conformity to the Act of Congress approved August, 1852, consists of nine members, three of whom are executive and have the general supervision and management of the fifteen districts into which the United States Coast (Atlantic and Pacific) is divided. Besides these, each district has an inspector and an engineer to superintend the operations of the district, and properly carry on the duties devolving upon the Board. The various district reports, embodied in the general Annual Report, are full of varied information, and, being well illustrated with special charts, give at a glance the complete development of the lighthouse system of the United States. It appears that there are 626 coast and harbour lighthouses with lights ranging from the first to the sixth order; 737 river lights, 3,114 buoys in position, 31 lightships and 56 fog-signals (steam or hot air). During the past year 13 new lights were exhibited, 6 lights were discontinued, and the characteristics of 10 lights were altered. Of automatic signal buoys 14 have been established since 1876. The amount estimated to be needed for the general service of the lighthouse establishment during the year is $3,322,137. The Appendix to the report is entirely scientific, (1) chiefly relating to the topophone and practical trials of methods by which the direction of a sound coming from a fog-horn might be recognised; and (2) experiments with machines for producing electric light. Many suppose that our transatlantic cousins are, in regard to the practical utilisation of scientific discoveries, in advance of us, but in respect of applying the electric light to lighthouses, they are only beginning to think of the subject. A few electric lights have been established on our own, and on the French coasts, for years; and experiments

relating to this method of illuminating lighthouses were made in this country by the authorities close upon a quarter of a century ago. Up to date Congress has only recently been asked for an appropriation, "as machines and lamps have been found sufficiently efficient and reliable to warrant further experiment in the nature of a practical trial in one of the coast lighthouses."

We come to the "United States Light List," and here we are fairly beaten. We have nothing on this side of the Atlantic that can compare with the fulness of the information given, whether in description, or as to the purpose for which a particular light in a given locality is shown. In fact the book is at once a "light list" and brief "sailing directions" for the coast of the United States, indicating *all* the dangers in the locality of each light, while pointing out the special use for which the light has been established. But there is another noteworthy fact connected with this "light list." The first line (on the wrapper and title-page) on which the eye falls is this, "A copy of this list will be sent free of charge to any shipmaster on application to office of the Lighthouse Board, Washington." Clearly the work is not sold, but meant for gratuitous distribution to the shipmaster, who requires all the aids to navigation that he can get, and he never has too many. Now this gratuitous distribution, by a governmental department, of the "light list" of the country, especially when a large appropriation is made to that department, is undoubtedly a very proper thing; and we think it would be well if, in this respect, every European government followed in the wake of the United States.

All that we have said of the "light list" applies, with equal force, to the "United States List of Beacons, &c.;" it is fuller than any other work of the kind we ever saw, and it also is distributed gratuitously.

The Newcastle Nautical Almanac, Directory and Guide to the Port of Newcastle for the year 1880, &c., &c. Newcastle, N.S.W.: R. C. Knaggs & Co.

This is the usual nautical ephemeris for the general use of seamen, together with the latest sailing directions for the port of Newcastle, accompanied by a chart on a large scale showing the *inner and*

outer soundings, corrected to June, 1879. There are also good directions for the various routes to China in the different seasons of the year. These subjects occupy the bulk of the book, but there are besides a few useful tables, some local information, and a general directory for the city of Newcastle. The almanac appears to be carefully compiled, the quality is good, and there is no lack of quantity. It does the author and publisher great credit.

Report of the Meteorological Council to the Royal Society, for the year ending 31*st of March*, 1879. London : Eyre & Spottiswoode.

As usual, the Report deals with the progress of Ocean Meteorology, Weather Telegraphy, and Land Meteorology of the British Isles; and is on the whole satisfactory. It were needless to refer to the subject of weather predictions, which has recently been ably dealt with in our pages: but we are specially gratified to be in a position to state that the Meteorology of the neighbourhood of the Cape of Good Hope is in hand, and will be discussed in relation to the winds, gales, and currents of the ocean; scarcely less important will be the examination of the surface temperature and currents of the Pacific Ocean for four representative months—February, May, August, and November. It is to be hoped that the proposed Meteorological Organisation for the West Indian Islands will not be quietly dropped, because we have much to learn yet upon the proper manœuvring of vessels in relation to the spiral movement of the wind within the storm area.

Shipping Office Guide for Owners and Masters of Home Trade Vessels, with a preface by Captain John Steele; published by permission of the Local Marine Board of London, by A. O. Cooper, a Deputy Superintendent of the Mercantile Marine Office, London.

A PRACTICAL and official guide to the modes of proceeding in respect to Mercantile Marine Office work was much required for the assistance of masters in transacting their business, so that they might always be within the requirements of the various Merchant Shipping Acts. In this "Shipping Office Guide" produced by Mr. A. O. Cooper, an authority on the subject, owners and masters of home-trade vessels will find ample instructions as

to their obligations under those Acts; and, what is to the purpose, the information is given in very clear and precise form, under the headings of—articles of agreement—official log-books—certificates—apprentices—discharge of crew—deaths—half-yearly returns—and regulations for maintaining discipline. We hope to see, at an early date, an equally valuable guide for those engaged in the "foreign trade."

We have much pleasure in announcing the publication of a useful work by Captain N. Hoffmeyer, entitled, "Etude sur les tempêtes de l'Atlantique Septentrional et projet d'un service télégraphique international relatif à cet Océan," Copenhagen, 1880. In this paper, to which a preface is written by Herr Buys Ballot, Captain Hoffmeyer advocates the collection of information by means of the telegraph from several places on the shores of the Atlantic, Azores, Ireland, Iceland, America, &c., with a view to gaining knowledge as to what is taking place in the atmosphere over the Atlantic, which would obviously be of great service in the prediction of weather from the west.

Impure Water.—Notice to Owners.—The Board of Trade having had their attention called on several occasions to the bad quality of the water obtained by British merchant ships at Rangoon, Bassein, Calcutta, and Aden, desire to suggest to owners of vessels trading to these and other ports at which the water is known to be of an impure character, that they should cause their vessels to be supplied with filters for the purpose of purifying the water obtained at such places. Several outbreaks of scurvy are supposed to have been caused by the consumption of water procured at the above-mentioned ports, which is stated to contain impure organic matter, and to be quite unfit for drinking purposes without filtration. The Board of Trade therefore hope that owners interested will comply with the suggestion now made with a view to preserving the health of the crews on board their vessels.—Thomas Gray, Assistant-Secretary, Marine Department.—By order of the Board of Trade, March, 1880.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge.		Hull.		North Shields.		Leith.		Devon-port.		Dover.		Weston-super-Mare.	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
S	1	6 30	7 2	11 23	—	8 21	8 59	7 15	7 51	10 16	10 50	3 48	4 18	11 24	11 57
S	2	7 35	8 11	0 2	0 40	9 38	10 18	8 30	9 11	11 26	—	4 49	5 21	—	0 32
M	3	8 50	9 30	1 16	1 50	10 55	11 30	9 49	10 23	0 4	0 44	5 53	6 27	1 9	1 46
Tu	4	10 6	10 40	2 23	2 55	—	0 2	10 55	11 24	1 23	1 58	7 1	7 35	2 23	2 57
W	5	11 11	11 40	3 25	3 52	0 30	0 55	11 49	—	2 29	2 57	8 4	8 29	3 28	3 58
Th	6	—	0 7	4 17	4 40	1 18	1 40	0 12	0 34	3 23	3 47	8 53	9 17	4 27	4 54
F	7	0 31	0 51	5 1	5 21	2 1	2 21	0 55	1 16	4 9	4 30	9 39	10 0	5 19	5 41
S	8	1 12	1 33	5 40	6 0	2 39	2 57	1 35	1 53	4 51	5 10	10 20	10 40	6 3	6 24
S	9	1 51	2 9	6 20	6 39	3 14	3 31	2 11	2 29	5 28	5 46	11 0	11 20	6 44	7 2
M	10	2 25	2 42	6 57	7 15	3 48	4 5	2 46	3 2	6 3	6 20	11 39	11 58	7 20	7 38
Tu	11	3 0	3 17	7 32	7 48	4 22	4 39	3 18	3 35	6 36	6 51	—	0 16	7 54	8 10
W	12	3 33	3 50	8 4	8 21	4 57	5 15	3 52	4 9	7 6	7 21	0 35	0 54	8 26	8 42
Th	13	4 8	4 26	8 38	8 56	5 33	5 51	4 27	4 45	7 37	7 53	1 13	1 32	8 58	9 15
F	14	4 43	5 1	9 15	9 35	6 10	6 30	5 4	5 25	8 9	8 25	1 51	2 10	9 32	9 49
S	15	5 18	5 39	9 56	10 18	6 52	7 16	5 48	6 12	8 42	9 4	2 31	2 53	10 7	10 25
S	16	6 8	6 25	10 43	11 13	7 42	8 11	6 37	7 5	9 27	9 52	3 15	3 39	10 46	11 10
M	17	6 50	7 17	11 45	—	8 43	9 17	7 36	8 9	10 21	10 52	4 4	4 30	11 37	—
Tu	18	7 48	8 20	0 19	0 52	9 53	10 26	8 44	9 18	11 26	—	4 57	5 25	0 7	0 38
W	19	8 55	9 31	1 22	1 52	10 56	11 26	9 51	10 20	0 3	0 41	5 54	6 24	1 11	1 44
Th	20	10 2	10 34	2 21	2 49	11 55	—	10 49	11 16	1 18	1 53	6 55	7 26	2 16	2 48
F	21	11 4	11 32	3 17	3 44	0 23	0 48	11 42	—	2 26	2 55	7 55	8 22	3 20	3 52
S	22	—	noon	4 9	4 34	1 11	1 34	0 5	0 28	3 23	3 50	8 49	9 16	4 23	4 54
S	23	0 25	0 50	4 59	5 24	1 58	2 22	0 52	1 17	4 16	4 41	9 43	10 10	5 24	5 53
M	24	1 15	1 38	5 50	6 16	2 46	3 10	1 42	2 7	5 6	5 31	10 37	11 4	6 21	6 48
Tu	25	2 4	2 30	6 42	7 8	3 34	3 59	2 32	2 56	5 56	6 21	11 32	Mid.	7 14	7 39
W	26	2 54	3 20	7 33	7 58	4 24	4 50	3 20	3 45	6 46	7 11	—	0 27	8 4	8 28
Th	27	3 46	4 11	8 23	8 48	5 16	5 43	4 11	4 38	7 36	8 0	0 55	1 23	8 52	9 16
F	28	4 36	5 2	9 14	9 41	6 10	6 37	5 5	5 33	8 24	8 47	1 51	2 18	9 39	10 2
S	29	5 28	5 55	10 8	10 37	7 5	7 34	6 2	6 31	9 11	9 36	2 45	3 11	10 24	10 46
S	30	6 22	6 48	11 7	11 40	8 5	8 37	7 0	7 31	10 2	10 28	3 37	4 3	11 10	11 35
M	31	7 16	7 45	—	0 14	9 10	9 44	8 4	8 37	10 56	11 26	4 29	4 55	—	0 4

Week Day.	Month Day.	Liver-pool.		Green-ock.		Queens-town.		Kings-town.		London-derry.		Brest.	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
S	1	3 44	4 19	4 32	5 4	9 50	10 23	3 45	4 22	0 45	1 30	8 43	9 17
S	2	4 58	5 36	5 37	6 18	10 59	11 35	5 0	5 37	2 15	2 55	9 55	10 33
M	3	6 16	6 56	6 49	7 25	—	0 11	6 11	6 44	3 30	4 1	11 11	11 47
Tu	4	7 31	8 1	8 1	8 33	0 47	1 20	7 16	7 45	4 28	4 51	—	0 20
W	5	8 27	8 51	9 0	9 26	1 50	2 18	8 12	8 39	5 12	5 33	0 48	1 14
Th	6	9 14	9 35	9 51	10 15	2 44	3 8	9 4	9 28	5 54	6 15	1 38	2 0
F	7	9 55	10 14	10 37	10 57	3 31	3 51	9 51	10 8	6 36	6 56	2 21	2 40
S	8	10 33	10 52	11 17	11 37	4 11	4 30	10 25	10 42	7 15	7 34	2 59	3 17
S	9	11 10	11 28	11 57	—	4 49	5 8	10 59	11 16	7 52	8 9	3 35	3 53
M	10	11 45	—	0 16	0 34	5 26	5 44	11 33	11 50	8 25	8 40	4 11	4 28
Tu	11	0 2	0 19	0 52	1 9	6 1	6 18	—	0 8	8 55	9 11	4 44	5 0
W	12	0 36	0 53	1 26	1 43	6 35	6 52	0 26	0 44	9 27	9 43	5 16	5 33
Th	13	1 10	1 27	2 0	2 17	7 10	7 28	1 2	1 20	10 0	10 18	5 51	6 9
F	14	1 45	2 4	2 35	2 53	7 46	8 5	1 39	1 59	10 38	11 1	6 28	6 49
S	15	2 24	2 46	3 13	3 35	8 25	8 47	2 22	2 45	11 29	Mid.	7 12	7 36
S	16	3 9	3 34	3 58	4 23	9 11	9 36	3 9	3 36	—	0 35	8 1	8 28
M	17	4 3	4 34	4 49	5 17	10 8	10 33	4 8	4 40	1 12	1 50	8 57	9 29
Tu	18	5 9	5 44	5 48	6 19	11 4	11 36	5 13	5 44	2 27	3 1	10 2	10 35
W	19	6 20	6 53	6 51	7 23	—	0 8	6 13	6 42	3 32	3 58	11 8	11 41
Th	20	7 23	7 52	7 54	8 24	0 40	1 11	7 10	7 38	4 22	4 44	—	0 12
F	21	8 19	8 44	8 52	9 19	1 41	2 10	8 5	8 32	5 5	5 27	0 40	1 7
S	22	9 9	9 31	9 46	10 13	2 38	3 [illegible]	8 59	9 26	5 49	6 13	1 33	1 58
S	23	59	10 24	10 40	11 7	3 34	4 1	9 51	10 15	6 39	7 5	2 23	2 48
M	24	10 49	11 14	11 34	—	4 28	4 54	10 39	11 3	7 31	7 56	3 13	3 38
Tu	25	11 39	—	0 1	0 28	5 20	5 46	11 27	11 52	8 19	8 42	4 3	4 28
W	26	0 4	0 29	0 54	1 20	6 12	6 38	—	0 18	9 5	9 29	4 53	5 18
Th	27	0 54	1 20	1 46	2 12	7 4	7 30	0 45	1 12	9 53	10 19	5 44	6 10
F	28	1 46	2 12	2 37	3 2	7 55	8 19	1 39	2 7	10 46	11 15	6 36	7 2
S	29	2 38	3 4	3 27	3 53	8 43	9 9	2 35	3 3	11 49	—	7 29	7 57
S	30	3 31	3 59	4 19	4 46	9 35	10 1	3 32	4 2	0 25	1 4	8 25	8 54
M	31	4 29	5 1	5 14	5 43	10 28	10 58	4 34	5 6	1 43	2 21	9 24	9 54

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ add. − *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 23	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 3	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 3	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 3	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Helgoland	+0 21	Dover
Holyhead	−1 12	Liverpool
ly Island harbour	−0 53	N. Shields
nfleur	+5 42	Brest
rness	−1 59	Leith

Place.	Constant. H. M.	Port of Reference.
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 13	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 43	London
Youghall	+0 13	Queenstown

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London, W.C.; and 6, Lord Street, Liverpool.

ENGLISH (APPLICATIONS).

1153. Wilton Stuart, Seaforth. "Improvements in ballasting ships and other vessels, and in ballast or containers for the same."

1176. Sir John Coode, Westminster. "Improvements in apparatus for landing or delivering sand, mud, shingle, gravel, or such like materials from barges and other vessels, especially such as may have been raised by dredging."

1198. William W. Fairbairn, Henry T. McClearn and William H. Ingersoll, all of Boston, Massachusetts, U.S.A. "Improvements in and relating to governors for marine engines." (A communication.) (Complete specification.)

1213. James Sample, Blyth. "Improvements in buoys or life and property saving apparatus for sea use."

1273. Peter P. Malloch, Perth, N.B. "Improvements in fishing reels."

1316. Edward Fraulob, Chemnitz, Saxony, Germany. "Improvements in the manufacture of lubricating pads or axle-box floats."

1323. Anton Graf, Islington. "Improvements in portable buoyant apparatus for saving life from drowning."

1326. John Bonaventure Ward, San Francisco, California, U.S.A. "An improvement in propellers for vessels." (Complete specification.)

1346. John Louis Lay, Paris, France. "Improvements in torpedo-boats and in apparatus for propelling and controlling the same and similar vessels." (A communication.)

1374. John E. Liardet, Brockley. "A new or improved automatic mushroom anchor."

1375. J. Evelyn Liardet, Wickham Park, Kent. "A new or improved double-grip anchor."

1408. Joseph Alfred Novello, Genoa, Italy. "Improvements in the construction of ships and vessels."

1466. Anton Graf, Islington. "Improvements in diving and swimming apparatus."

1501. Edward B. Campbell, Dublin. "Improvements in the method of discharging or unloading vessels and in apparatus for that purpose."

AMERICAN.

224289. David G. Haskins, Cambridge, Mass. "A screw-propeller."

224346. John W. D. McDonald, Bembridge, Isle of Wight, Great Britain. "A folding boat."

224364. Samuel F. Tappin, San Francisco. "A power steering apparatus for vessels."

224415. Charles L. French, New York. "A rowing wagon."

224424. John Hancock, Louisville. "A peg float."

224469. Dana Parks, Boston, Mass. "A self-levelling ship's berth."

224505. John W. Alexander, New York. "A crane for loading vessels."

224511. Charles F. Brush, Cleveland, Ohio. "A vessel and machinery for aerial navigation."

224691. Ferdinand Imhorst, Baltimore. "A construction of freighting-vessels."

BELGIAN.

50527. F. Van Rysselberghe, Brussels. "A tidal distant-signal."

50649. J. W. De Caux. "Improvements in apparatus employed in deep-sea fishing or trawling."

FRENCH.

133028. Tisson. "Improvements in the means or apparatus employed for propelling ships or vessels, such improvements being applicable as an auxiliary means for imparting motion to the same."

133134. Jepsen. "An apparatus for cleaning ship's bottoms."

133177. Iverneau and Lambert, Paris. "Tidal motors."

133178. Dumoulin-Froment. "Illuminating sea-compasses."

133250. MacKenzie. "Increasing the effective power of screw-propellers."

133254. Billhaud, jun. "Insubmersive bathing and pleasure boats."

133271. Coupey-Reboux, Lille. "Sifters combined with ladders or steps, and applying the same to vehicles and boats."

PATENTS PUBLISHED.

Machinery for Propelling Vessels.

2667. July 1, 1879. Samuel W. Snowden, Rathgar, Dublin. The invention consists of the insertion into the length of shafting between the bearings of one or more cup and ball joints, and causing the driving power to be transmitted through these joints by providing studs or projections upon the ball entering and interlocking with grooves formed within the cup; or the arrangement may be reversed, the studs being fixed within the cups, and the grooves being formed on the face of the ball. In either case the play of the projections or studs in the grooves compensates for any deviation from true alignment there may be in respect to the bearings. The object being to remove the rigidity and to secure freedom in the screw shafting. The projections or studs it will be seen are not exposed to the thrust of the screw, which is sustained by the ball and the cup.

Ships' Lights.

2913. July 19. A. M. Clark. Price 6d. A green light is used for starboard and a red light for port, each being visible as an ordinary fixed or permanent light through an arc of 90°, from right a-head to right a-beam, and through another arc of 90°, from right a-beam to right a-stern, as an intermittent light displayed during five seconds and giving a flash at the fifth second; at the expiration of five seconds the light is entirely eclipsed for five seconds. A white light is hung a-stern and at the inner masthead, and is eclipsed every five seconds.

Demagnetising Iron Ships to Prevent Deviation of the Compass.

3164. August 6, 1879. E. H. Hopkins, Richmond, Surrey. The invention relates to a new mode of removing the magnetism in the iron of ships. It is applicable to iron, steel, or composite vessels, and not only to the beams, ribs, plates, and other portions of the ship's framework and hull, but also to the steering-gear, masts, davits, stanchions, or indeed any masses of iron that may be in the vicinity of the compass. The method consists in passing one or more straight electro-magnets, held more or less in the angle of the magnetic dip over the surface of the deck, and immediately over the iron beams from end to end of each beam. Those

portions of the ship's framework that are in a vertical position are submitted to the same treatment, but it is found necessary in these cases to assist the demagnetising influence by causing a vibration through the iron.

BOARD OF TRADE CIRCULAR.—COLOUR BLINDNESS.—The Board of Trade have decided that on and after the 15th March, 1880, the following arrangements shall be made in respect to the examination of persons as to their ability to distinguish colours. 1. Examinations in colour shall be open to any person serving or about to serve in the Mercantile Marine. 2. Any person desirous of being examined must make application to a superintendent of a Mercantile Marine Office on Form Exn. 2[a], and pay a fee of one shilling. 3. He must on the appointed day attend for examination at the examiner's office; and if he passes he will receive a certificate to that effect. 4. In future the examination of a candidate for a master's or mate's certificate, who does not, at the time of making application, hold a certificate of competency of any grade, will commence with the colour test, and if the candidate fails in that test he will not be allowed to present himself for examination in navigation and seamanship. The fee he has paid for examination for a certificate of competency will include the fee for the colour test, and, with the exception of one shilling, will be returned to him. 5. A candidate who has obtained a certificate before these regulations came into force, and who on presenting himself for examination for a certificate of a higher grade is unable to pass the colour test, will notwithstanding be permitted to proceed in the examination in navigation and seamanship for the certificate of the higher grade; but should he pass this examination, the following statement will be written on the face of the higher certificate which may be granted to him, viz.: "This officer has failed to pass the examination in colours." Should he fail to pass the examination in navigation and seamanship, a like statement, relating to his being colour blind, will be made on his inferior certificate before it is returned to him.—T. H. FARRER, Secretary.—THOMAS GRAY, Assistant-Secretary.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
139	England — Thames Entrance — North Foreland	Light to be altered in June.
140	„ South Coast—Plymouth Breakwater	Light to be altered in June.
141	„ East Coast—The Would	New light-vessel in September.
142	Ireland—South-east Coast	Information respecting telegraph beacons.
143	North Sea—Belgium—West Hinder and Wielingen Light-vessels	Exhibition of riding lights.
144	„ „ Nieuport	New harbour light.
145	„ Holland—Maas River—Brouwershaven Gat	Supposed discovery of shoal.
146	„ Elbe River Entrance	Alteration in pilot vessel's light.
147	„ „ Mielstacks	New light.
148	Baltic—Gulf of Riga—Domeness	New Syren fog-signal.
149	France—North Coast—Paimpol Bay—Portzdon Point	New light.
150	„ „ Brehat Isle—Paon Point	Alterations in light.
151	„ West Coast—Ile d'Yeu—Port Breton	New light.
152	Spain—North-west Coast—Cape Finisterre	Irregular action of revolving light.
153	Mediterranean—Adriatic—Fiume	Alteration in Mole Head light.
154	„ Gulf of Corinth—Drepano Point	New harbour light.
155	Africa—East Coast—Delagoa Bay	Light-vessel foundered; buoy near wreck.
156	India—West Coast—Beypore Road	Position of buoy marking rocks.
157	„ East Coast—Madras	Information respecting time-signal.
158	„ Bay of Bengal — False Point Anchorage	Re-exhibition of light, &c.
159	„ „ Hooghly River Entrance	Extension of period of exhibition of intermediate light.
160	Burmah — Martaban Gulf — Krishna Shoal Light-vessel	Maroon lights discontinued, &c.
161	Eastern Archipelago—Java—Batavia Road	Reported danger.
162	„ „ Billiton Island—West Coast	Sunken danger.
163	China—East Coast—Amoy Harbour	Light-vessel marking wreck.
164	„ Gulf of Pecheli—Peiho River Entrance	Prohibited anchorage near telegraph cables.
165	Japan — West Coast — Goto Islands — Fukuye Island—Cape Goto	New light.
166	„ Nipon—East Coast—Kingkasan	Steam Syren fog-signal at lighthouse.
167	„ Yezo Island — Risiri Island — Nakko Bay	Information respecting anchorage, &c.
168	Australia—East Coast—Crowdy Head	New light.
169	„ „ Cape Cleveland	New light.
170	„ „ Port Douglas	New light on Island point.
171	New Zealand—Middle Island—Dusky Sound—Nine-Fathom Passage	Reported sunken rock.

MONTHLY ABSTRACT OF NAUTICAL NOTICES—*continued.*

No.	PLACE.	SUBJECT.
172	NEW ZEALAND — Middle Island — Cook Strait—Wairau River	New harbour light.
173	„ North Island—Wanganui River	Lights on training walls.
174	UNITED STATES—Pacific Coast—Oregon —Koos Bay	Automatic signal-buoy off Outer Bar.
175	„ „ California—San Luis Obispo	Automatic signal-buoy.
176	NORTH AMERICA—West Coast—Mazatlan —Creston Island	New light.
177	WEST INDIES—Haiti—Port Plata	New light.
178	UNITED STATES—Virginia—Cape Charles	Automatic signal-buoy.
179	„ Maryland—Piney Point	New fog-bell.
180	CANADA—Gulf of St. Lawrence—Strait of Belle-Isle—Belle-Isle	New light on southern point.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

139.—ENGLAND.—*Thames Entrance.—Alteration in the Character of the Light at the North Foreland.*—The proposed change, as indicated in January No., p. 72, will be made in June next. Further notice will then be issued.

140.—ENGLAND.—*South Coast.—Alteration in the Light on Plymouth Breakwater.*—The proposed change, as indicated in January No., p. 72, will be made in June next. Further notice will then be issued.

141.—ENGLAND.—*East Coast.—New Light-Vessel in the Would.*—With a view of facilitating the navigation through the Would, it is intended to place a light-vessel, with a *quick revolving light*, showing *a flash every 5 seconds*, off the south end of Haisbro' sand. The vessel will be placed during the month of September, 1880, and at the same time the Newarp light-vessel will be moved a little to the southward of her present position.

N.B.—The attention of mariners is particularly directed to the difference in character between the Would and that of the Newarp and the Leman and Ower light-vessels; the Would will be as scribed above, viz., a quick-revolving light, showing a flash ery five seconds; but the Newarp and Leman and Ower are

group-flashing lights, the Newarp showing three flashes in quick succession, followed by an interval of 36 seconds of darkness (the whole revolution occupying one minute), and the Leman and Ower giving two quick flashes, followed by 20 seconds of darkness, and repeated every half-minute. Further notice will be issued when the Would light-vessel has been placed.

142.—IRELAND.—*South-East Coast.*—(1) *Greenore Point.—Removal of Telegraph Beacons.*—The two beacons (which formerly indicated the direction of a telegraph cable) situated on the summit of the cliff south-west of Greenore point, have been removed.

(2) *Telegraph Beacons near Blackwater Head.*—Two beacons, indicating the direction of a telegraph cable, have been placed at Ballynaclash, south-westward of Blackwater head. The front beacon, painted white and marked *Telegraph Beacon*, is situated near the coast on the south side of Flaherty's gap, and bears S.W. by W. ¼ W. from Blackwater head distant nine-tenths of a mile. The rear beacon, painted white, is situated about 500 yards N.N.W. ⅜ W. from the front beacon.

Note.—These beacons in line indicate the direction of the telegraph cable as far as Lucifer bank, thence the cable trends a little more easterly and passes fully half a mile south-westward of Lucifer shoals light-vessel. Mariners are cautioned not to anchor in the vicinity of the cable. *Variation*, 21¾° *W.*

143.—NORTH SEA.—*Belgium.—West Hinder and Wielingen Light-Vessels, Exhibition of Riding Lights.*—From 1st March, 1880, a riding light would be exhibited from sunset to sunrise from the fore stay (at a height of about 6 feet above the rail) of West Hinder and Wielingen light-vessels—moored respectively—southward of West Hinder bank, and in Wielingen channel at the entrance to West Schelde. They are ordinary *white* lights.

144.—NORTH SEA.—*Belgium.—Nieuport.—Harbour Light on the West Mole.*—It is a *fixed green light* elevated 19 feet above high water, and visible from a distance of 3 miles. Position, lat. 51° 9′ 25″ N., long. 2° 43′ 30″ E.

145.—NORTH SEA.—*Holland.—Maas River Entrance.—Brouwershaven Gat.—Shoal near Schouwen Bank.*—From statements made by Flushing pilots, a shoal exists near the north-eastern part

of Schouwen bank, approach to Brouwershaven gat. It is said to be of small extent, with 19 feet over it at low water spring tides, and to lie N.E. by N. from Schouwen bank bell beacon vessel, distant 1½ mile. *Variation*, 16½° *W.*

146.—North Sea.—*Elbe River Entrance.—Alteration in Pilot Vessel's Light.*—In order to distinguish better the position of the pilot vessel stationed at Elbe river entrance below Cuxhaven (at either her outer or inner station), the following alteration has been made in the light exhibited from that vessel:—The fixed white light previously shown from the foremast is discontinued; and in place thereof, a *fixed white* light is exhibited from the fore stay, elevated 18 feet above the sea, and a *fixed red* light from the mizen mast, elevated 61 feet above the sea.

147.—North Sea.—*Elbe River—Light near Mielstacks.*—In order to facilitate the navigation of the channel between Hanskalb-sand and Lühe, a light is exhibited from the jetty near Mielstacks, left bank of Elbe river. It is a *fixed white* light, elevated 26 feet above high water, and visible from a distance of 5 miles in the fairway between Schulau light-vessel, and the two white buoys 2 A and 2 B. Exhibited from December to March. The light-house, 7 feet high, is a square wooden building painted black. Position approximate, lat. 53° 34′ N., long. 9° 39′ E.

148.—Baltic.—*Gulf of Riga.—Fog-Signal near Dome-Ness Lighthouse.*—The signal is a syren, and will be sounded during thick or foggy weather.

149.—France. —*North Coast.* — *Paimpol Bay.* — *Light on Portzdon Point.*—Exhibited from the gable end of the keeper's dwelling on Portzdon point, north side of entrance to Paimpol harbour. It is a *flashing* light, elevated 35 feet above high water (17 feet above the ground), showing *red* through an arc of 7½°, or between the bearings of N. 61° W. and N. 69° W.; and *white* through an arc of 3½°, or between the bearings of N. 69° W. and N. 72½° W.; in all other directions it will be obscured. The white light should be visible from a distance of 11 miles; the red light from a distance of 7 miles. Position, lat. 48° 47′ 30″ N., long. 3° 1′ 40″ W.

150.—France.—*North Coast.—Bréhat Isle.—Alterations in*

Paon Point Light.—The light (fixed red) will show a *cluster of white rays* through an arc of 8°, or between the bearings of N. 25¼° W. and N. 33¼° W.; visible from a distance of 12 miles. The intensity of the red light will also be increased so that it should be visible from a distance of 8 miles.

Note.—Vessels approaching Paimpol anchorage at night, should carefully keep within the limits of Portzdon point *white* light—bearing in mind that the light is obscured northward of this sector, and that it shows red southward of it. Coming from the northward through Bréhat channel, vessels should enter the sector of *white* light shown from Paon point, and keep within its limits until Portzdon point *white* light is seen, towards which they may then steer—proceeding—Paon point light will change in colour and become obscured at the entrance to Portzdon anchorage.

151.—France.—*West Coast.—Ile d'Yeu.—Light at Port Breton.*—From a lighthouse erected on the extremity of the north-west pier. It is a *flashing* light, visible through an arc of 163½°, showing *white* flashes between the bearings of N. 55½° W. and S. 9½° E.; and *red* flashes between S. 9½° E. and S. 39° E.; elevated 26 feet above high water. The white light, visible from a distance of 9 miles; the red light, 6 miles. The lighthouse, 20 feet high, octagonal in shape and constructed of metal, is painted red. Position, lat. 46° 43′ 45″ N., long. 2° 21′ 0″ W.

Note.—With the white light in sight, vessels will be clear of the dangers near point Gautier, and those south-eastward of port Breton; also of du Boite shoal, north-westward of that port. The south-west limit of the sector of red light leads half a cable seaward of Cantin shoal, so that vessels approaching from the north-westward with the flashing red light in sight, are clear of that danger, but it should be borne in mind that the red light is shown over du Boite shoal. *Variation*, 18½° *W.*

152.—Spain.—*North-West Coast.—Irregular Action of Cape Finisterre Revolving Light.*—This light—described as a revolving white light, attaining it greatest brilliancy every half-minute—was observed by H.M.S. *Inconstant* at 1h. 10m. a.m. of 29th February, 1880, distant then 22 miles, and passed at the distance of 15 miles; during the time the light remained in sight—the night being clear

and fine—it appeared as a *fixed* light, without flashes or intervals of obscurity. Previous reports having been received as to the uncertainty of the character of this light, some observers having considered it fixed and flashing, others as fixed when within a distance of 10 miles, mariners are therefore cautioned, that cape Finisterre light may not on all occasions answer to the description of a revolving light attaining its greatest brilliancy every half-minute.

153.—MEDITERRANEAN.—*Adriatic.—Fiume—Alteration in Mole Head Light.*—Exhibited from lantern, now shows *red* in an easterly and westerly direction; *white* to the northward and southward.

154.—MEDITERRANEAN.—*Gulf of Corinth.—Light on Drepano Point.*—A harbour light is exhibited from a wooden structure situated S. 56° E. distant 400 yards from the extremity of Drepano point, south side of entrance to the gulf of Corinth. It is a *fixed white* light, elevated 28 feet above the sea, and visible from a distance of 7 miles. The keeper's dwelling adjoins the wooden structure. Position approximate, lat. 38° 20′ 0″ N., long. 21° 51′ 20″ E. *Variation, 7½° W.*

155.—AFRICA.—*East Coast.—Delagoa Bay.—Cockburn Light-Vessel Foundered.*—In consequence of the Cockburn shoal light-vessel having foundered, a small buoy, painted red, has been placed near the position of the wreck.

156.—INDIA.—*West Coast.—Beypore Road.—Position of Buoy Marking Rocks.*—The buoy (black) marking the rocks southward of the anchorage, has been moored with the following bearings, viz.:—Beypore flagstaff, N. by E. ½ E.; Southern boundary pillar, E. ½ N. *Variation, ¾° E.*

157.—INDIA.—*East Coast.—Madras.—Time Signal.*—With reference to Notice, March No., p. 248, on the establishment of a time signal at Madras, further notice has been given, that when the semaphore at the Master Attendants' flagstaff does not drop at the correct time, signal C V N J of the Commercial code will be hoisted immediately, and kept flying for half-an-hour.

158.—INDIA.—*Bay of Bengal.—False Point Anchorage.—Re-Exhibition of False Point Light, and Discontinuance of Signals.*—The new light was exhibited on 1st Feburary, 1880; it is a *fixed white* light, elevated 129 feet above high water, and visible seaward

from a distance of 19 miles. The lighthouse, 132 feet high, is constructed of red granite, and has a large white star in the centre, facing eastward. Position, lat. 20° 20′ 20″ N., long. 86° 44′ 0″ E. On the exhibition of this light, the blue lights and rockets previously shown from False point lighthouse would be discontinued.

Note.—In consequence of the extension of the sand spit north-westward of Redde-point, False point lighthouse in line with Plowden point beacon is not available as a leading mark for entering the harbour. The Spit buoy (red) is now distant 6 cables from the tripod beacon.

159.—INDIA.—*Bay of Bengal.—Entrance to River Hooghly.—Extension of Period of Exhibition of " Intermediate " Light.*—The *Intermediate* light-vessel will be replaced in position on the 1st April, 1880, but will remain at her station until the 30th of November next, instead of the 31st October as heretofore. During the year 1881, and in all future years, until further notice, the light-vessel will be kept at her station, and the light exhibited, from the 1st February to the 30th November inclusive.

160.—BURMAH.—*Martaban Gulf.—Krishna Shoal Light-Vessel.—Discontinuance of Maroon Lights.*—On and after 1st July, 1880, the exhibition of *maroon* lights will be discontinued, but a *blue* light will be shown every half-hour as at present.

161.—EASTERN ARCHIPELAGO.—*Java.—North Coast.—Batavia Road.—Reported Danger Eastward of Dapoer Islet.*—This danger *(Cleveland reef)* on which the British barque *Cleveland* is said to have struck in November, 1879, is of coral formation, and is reported to lie about E. by S. ¼ S. from Dapoer islet, distant $1\frac{6}{10}$ths mile. Position approximate, lat. 5° 56′ S., long. 106° 44½′ E.

Note.—A buoy, painted white, has been placed to mark Cleveland reef. *Variation, ¾° E.* Further particulars concerning this reef will be published hereafter.

162.—EASTERN ARCHIPELAGO.—*Billiton Island.—West Coast.—Sunken Danger in Tieroetioep Bay.*—This danger, on which H.N.M. Surveying vessel *Hydrograaf* struck, is of coral formation, extending half a cable in a north-west and south-east direction, with a least depth over it of 2 fathoms; it lies with the following

bearings, viz.:—Kalmoa islet, S. 85° E.; Mount Betaling (Pulo Mendanao), S. 26½° W. *Variation*, 1½° *E.*

163.—CHINA.—*East Coast.—Amoy Outer Harbour.—Light-Vessel Marking Wreck.*—Exhibited from the mast-head of a junk moored over the wreck of the *Lunan*, sunk in Amoy outer harbour; it is a *fixed white* light, visible from a distance of about 8 miles. The wreck lies in 7 fathoms at low water spring tides, with the following bearings, viz:—Tsing-seu lighthouse, S. 41° E.; Tae-tan (Taitan) lighthouse, S. 85° E. *Variation*, ½° *W.*

164.—CHINA.—*Gulf of Pecheli.—Peiho River Entrance.—Taku.—Prohibited Anchorage near Telegraph Cables.*—Two telegraph cables have been laid in the undermentioned positions at Taku, Peiho river entrance—(1) A cable connects the upper corner of Taku South fort with the lower corner of the North fort; (2) A cable connects the China Merchants' Steam Navigation Company's landing pier with the North bank of the river, and is landed about 20 yards above the landing steps of the North fort. Mariners are cautioned not to anchor in the vicinity of these cables.

Note.—It is intended to indicate the positions of the cables by beacons.

165.—JAPAN.—*West Coast.—Goto Islands.—Fukuye Island.—Light on Cape Goto.*—Exhibited from a lighthouse erected on cape Goto (Ose Saki), the south-west extreme of Fukuye (southernmost island of the Goto group). It is a *revolving white* light, attaining its greatest brilliancy *every thirty seconds*, visible from seaward between the bearings of N. 55° W. and S. ½° E.; elevated 265 feet above high water, and should be seen from a distance of 22 miles. The lighthouse, 36 feet high, circular in shape and constructed of iron, is painted white. Position, lat. 32° 36′ 45″ N., long. 128° 36′ 5″ E.

166.—JAPAN.—*Nipon Island.—East Coast.—Fog-Signal at Kingkasan Lighthouse.*—It is a steam syren, which, during thick weather, fogs or snowstorms, will give a blast of *five seconds'* duration at intervals of *fifty-five seconds.*

167.—JAPAN.—*Yezo Island.—Risiri Island.—Nakko Bay,* situated on the north-east side of Risiri island (18 miles south-west from cape Nossyab, the north-west extreme of Yezo island), is one

mile wide and little over half a mile deep, with 10 to 12 fathoms water in the entrance, decreasing gradually to 3 fathoms within about 2 cables from the shore. Nakko head (280 feet high), the north entrance point of the bay, is faced with a cliff 100 feet high; the south shore is composed of table land about 250 feet high, and thickly wooded. There is a landing place at the village on the west side of the bay, about a quarter of a mile southward of Nakko head. The anchorage recommended for steam vessels is in 6 to 10 fathoms, sand, in the northern part of Nakko bay, the holding ground appeared to be good. Spring tides rise 4 feet (approximate). *Variation*, 4° *W.*

168.—AUSTRALIA.—*East Coast—Light on Crowdy Head, and Discontinuance of Manning River Head Light.*—It is a *fixed white* light, visible in all directions seaward, but is masked over Mermaid reef and from that reef to the land northward; it should be seen from a distance of about 11 miles. Position approximate, lat. 31° 51′ 10″ S., long. 152° 46′ 0″ E. On the exhibition of Crowdy head light, the light previously shown from the pilot station on the north side of entrance to Harrington inlet (Manning river), was discontinued.

169.—AUSTRALIA.—*East Coast.—Light on Cape Cleveland.*—From a lighthouse near the extremity of the cape, eastern side of Cleveland bay; it is a *revolving* light, attaining its greatest brilliancy *every twenty seconds*, elevated 210 feet above the sea, and visible from a distance of about 20 miles. The light shows *red* through an arc of about 16°, over Salamander reef. Vessels after passing through this red sector, will, while the white light is in sight, be clear of Salamander reef. The lighthouse, 35 feet high and circular in shape, is painted white. Position, lat. 19° 11′ 25″ S., long. 147° 1′ 10″ E.

170.—AUSTRALIA.—*East Coast.—Port Douglas.—Light on Island Point.*—Exhibited from the north extreme of the point; it is a *fixed red* light, visible between the bearings of W. by N. and S.E. by S.; elevated 82 feet above high water, and should be seen from a distance of about 8 miles. The lighthouse, 20 feet high, is painted white. Position, lat. 16° 28′ 25″ S., long. 145° 29′ 20″ E.

Note.—With this light in sight, vessels from the southward will be clear of Whitworth and Alexandra reefs; and when approaching the anchorage at port Douglas, will avoid Morey reef.

171.—NEW ZEALAND.—*Middle Island.—West Coast.—Dusky Sound.—Reported Sunken Rock in Nine-Fathom Passage.*—Between Cooper island and the mainland; reported by Mr. Garrard, commanding the steam-vessel *Albion*, to lie about 30 yards from the shore of the mainland.

172.—NEW ZEALAND.—*Middle Island.—Cook Strait.—Harbour Light at Wairau River Entrance.*—Exhibited from the flagstaff at the western side of Wairau river entrance, Cloudy bay; it is a *fixed white* light, elevated 38 feet above high water, and should be seen from a distance of about 11 miles.

173.—NEW ZEALAND.—*North Island.—South-West Coast.—Wanganui River.—Lights on Training Walls.*—Exhibited from each of the lower extremities of the Training walls, at present situated about half a mile above Languard bluff, Wanganui river. The lights are *fixed red* lights.

Note.—The distance across the river between these lights is 500 feet. They will be moved down the river as the works advance.

174.—UNITED STATES.—*Pacific Coast.—Oregon.—Automatic Signal Buoy off Outer Bar of Koos Bay.*—This buoy, painted with alternate black and white perpendicular stripes, gives blasts of a whistle at short intervals, and is moored in the place of the old outer bar buoy, in 15 fathoms water, 1½ mile, W.N.W. ¾ W., from the outer bar at the entrance to Koos bay, and 1⅞ mile, N. by W. ½ W., from the lighthouse on Cape Arago. Bearings of prominent objects are as follows:—Cape Arago (Gregory) lighthouse, S. by E. ½ E.; Yokam Point, S.E. ¾ S.; Koos Point, E.S.E.; Empire City, N.E. by E.

175.—UNITED STATES.—*Pacific Coast.—California.—Automatic Signal Buoy off San Luis Obispo.*—This buoy, giving blasts of a whistle at short intervals, has been moored off the harbour of San Luis Obispo, in 12 fathoms water. Bearings of prominent objects are as follows:—Whaler island, N.N.E. ¼ E., distant 1 mile; Pecho rock, N.W. by W., ⅞ W.

176.—NORTH AMERICA.—*West Coast.—Mazatlan.—Light on Creston Island.*—From a lighthouse erected on the summit (Morro), of Creston island, western side of entrance to Mazatlan harbour; it is a *fixed white* light, visible from a distance of about 20 miles. The lighthouse consists of a square tower rising from the centre of a square building—both painted white—lantern red. Position approximate, lat. 23° 10′ 45″ N., long. 106° 23′ 10″ W.

177.—WEST INDIES.—*Haiti.—North Coast.—Light at Port Plata.*—From a lighthouse erected on the eastern entrance point of port Plata. It is a *revolving white* light, interval of revolution *twenty seconds*, elevated 137 feet above the sea, and visible from a distance of 14 miles. The lighthouse is an open iron structure, 60 feet high and octagonal in shape. Position approximate on plan, lat. 19° 49′ 20″ N., long. 70° 41′ 15″ W. *Variation*, 3° *E.*

178.—UNITED STATES.—*Virginia.—Automatic Signal-Buoy off Cape Charles.*—This buoy, painted red, with the letters C. C. in white, and giving blasts of a whistle at short intervals, is moored 6½ miles south-east of Cape Charles lighthouse, in about 6 fathoms of water.

179.—UNITED STATES.—*Maryland—Fog-Bell at Piney-Point Light-Station.*—It will be sounded during thick and foggy weather at intervals of 20 seconds. The bell-tower is located 15 feet west of the lighthouse.

180.—CANADA.—*Gulf of St. Lawrence.—Strait of Belle-Isle.—Belle-Isle.—New Light on Southern Point.*—In consequence of the old light, from its great height, being frequently obscured by fog, a light is now exhibited from a lighthouse erected about 300 feet below the old lighthouse on the southernmost point of Belle-isle, strait of Belle-isle, Newfoundland. It is a *fixed white* light, elevated 128 feet above high water, and visible from a distance of 17 miles in all directions where not intercepted by the high land of the island to the northward. The lighthouse, 31 feet high, square and constructed of wood, is painted white. Position, lat. 51° 53′ 0″ N., long. 55° 22′ 15″ W.

OUR OFFICIAL LOG.

Official Inquiries at Home, 1880.

(*This List is completed to the 18th of each Month.*)

519. *Lady Ann*, s.s.; built at Sunderland, 1877; owned by Mr. T. J. Reay; tonnage, 579; Sunderland to Bordeaux; coals; lost near North Sea Landing, Flamborough Head, January 28, 1880. Inquiry held at Newcastle, February 16, 1880, before Rothery, Wreck Commissioner; Forster and Castle, N.A. Master and chief mate to blame for steering too westerly a course and neglecting to use the lead. Certificate of master suspended for three months, and that of mate for six.

531. *Olivet*, barque; built at Sunderland, 1872; owned by Mr. George Simpson; tonnage, 435; Sunderland to Batavia; coals; abandoned at sea, January 21, 1880. Inquiry held at Sunderland, March 5, 1880, before Ritson and Weiner, Justices; Parfitt and Wilson, N.A. Master justified in abandoning his vessel.

532. *Arizona*, s.s.; built at Fairfield, Lanark, 1879; owned by Mr. S. B. Guion, Liverpool; tonnage, 2,928; New York to Liverpool; passengers and general cargo; suffered material damage by collision with an iceberg, November 7, 1880. Inquiry held at Liverpool, March 6, 1880, before Raffles, Stip. Mag.; Holt, Forster and Beasley, N.A. Casualty caused by collision with an iceberg which was not seen in time to be avoided consequent upon an inefficient look-out. Master and second mate's certificates suspended for six months.

536. *Resolution*, brig; built in 1860; tonnage, 275; Newcastle to Para; coals; stranded near Anajaes Point, coast of Brazil, January 9, 1880. Inquiry held at Sunderland, March 12, 1880, before Booth and Robson, Judges; Harris and Curling, N.A. Casualty due to striking on a shoal not laid down in the Admiralty charts. Master's certificate not dealt with.

537. *Sportsman*, s.s.; built at Low Walker, 1880; owned by Mr. W. J. Jobling; tonnage, 984; the Tyne to Bergen; coals; lost Bergen, February 2, 1880. Inquiry held at North Shields, 8, 1880, before Jackson and Hedley, Justices; Harris and

Curling, N.A. Accident caused by want of caution on the part of the pilot in charge whilst navigating a very narrow channel. Master's certificate not dealt with.

538. *Sea Nymph*, brig; built at Sunderland, 1847; owned by Mr. J. Stonehouse and others; tonnage, 223; Hartlepool to Rotterdam; coals; lost on Zeehound Flat, West of Sconen, February 23, 1880. Inquiry held at Middlesborough, March 13, 1880, before Coleman, Judge; Sceales and Beasley, N.A. Master reprimanded for not giving more attention to navigation, and mate to blame for not calling the master and for not using the lead. Mate's certificate suspended for three months.

540. *Duart Bay*, ship; built at Dumbarton, 1875; owned by Mr. J. S. Hatfield and others; tonnage, 935; Rangoon to Falmouth; rice; abandoned at sea, February 10, 1880. Inquiry held at Glasgow, March 12, 1880, before Graham and Coulborn, Justices; Hight, White and Ward, N.A. Abandonment justifiable in the circumstances. Court admonished master for not exercising such energy and skill as was required.

542. *Mino*, s.s.; built at Seacombe, 1872; owned by Messrs. Strong, Reid and others; tonnage, 450; Liverpool to Grand Canary; guano; supposed to be lost at sea. Inquiry held at Liverpool, March 19, 1880, before Raffles, Stip. Mag.; Parfitt and Wilson, N.A.; Ravenhill, E.A. Court found that the vessel left port in good and seaworthy condition, and that there was no evidence before them as to cause of loss.

543. *Magic*, schooner; built at Prince Edward Island, 1876; owned by Mr. J. Moir and others; tonnage, 152; Newport to Lisbon; coals; supposed to be lost at sea. Inquiry held at Newport, March 10, 1880, before Rothery, Wreck Commissioner; Parfitt and Wilson, N.A. Court held that the vessel when leaving port was in all respects seaworthy, and that no blame is attributable to the owners.

544. *Jones Brothers*, s.s.; built at Middlesborough, 1871; owned by Messrs. Jones Bros.; tonnage, 481; Bilbao to Newport; iron ore; suffered material damage by reason of an explosion of the boiler, January 27, 1880, whereby three lives were lost. Inquiry held at Newport, March 12, 1880, before Rothery, Wreck

Commissioner; Parfitt and Wilson, N.A.; Ravenhill, E.A. Court held that the owners were to blame for the accident in not taking measures to ascertain from time to time the actual state of the boilers. Fined £100.

549. *Matilda Hilyard*, barque; built at Portland, St. John, New Brunswick, 1868; tonnage, 588; stranded on the Horse Sand, March 1, 1880. Inquiry held at Ardrossan, March 23, 1880, before Mutter and Bailey, Justices; Burney, Hight and Beasley, N.A. Master guilty of an error of judgment in standing in too close to Ardrossan harbour in search of a pilot. Censured and admonished to be more careful.

550. *William Burkitt*, s.s.; built at Hebburn-on-Tyne, 1879; owned by Mr. G. A. Laws; tonnage, 1,231; Falmouth to Revel; cotton; stranded on Kullagrunden Reef, Baltic, December 27, 1879. Inquiry held at North Shields, March 18, 1880, before Spence and Swan, Justices; Harris and Curling, N.A. Casualty due to the master steering too fine a course, but in consequence of previous good character and his having only just assumed command of the ship, his certificate was not dealt with.

552. *A. M. Rowlands*, barquantine; built at Port Dinorwic, 1873; owned by Mr. R. Jones; tonnage, 176; London to St. Lucia; general cargo; abandoned at sea, February 24, 1880. Inquiry held at Liverpool, March 23, 1880, before Raffles, Stip. Mag.; Parfitt and Wilson, N.A. Abandonment justifiable.

553. *John Abbott*, barque; built in Finland, 1857; owned by Mr. J. Abbott and others, of Penrith; tonnage, 484; Cardiff to Quebec; coals; abandoned at sea, February 20, 1880. Inquiry held at Liverpool, March 24, 1880, before Raffles, Stip. Mag.; Parfitt and Wilson, N.A. Abandonment justifiable.

554. *Wild Wave*, brig; built at Shoreham, 1864; owned by Mr. Thomas Gates; tonnage, 279; New York to Spain; grain in bulk; abandoned at sea, February 19, 1880. Inquiry held at Swansea, March 25, 1880, before Fowler, Judge; Harris and Curling, N.A. Abandonment justifiable.

555. *Durley*, s.s.; built at Yarrow, 1871; owned by Mr. C. Palmer; tonnage, 1,147; stranded on rocks near Cape St. Vincent, August 9, 1879. Inquiry held at Swansea, March 28, 1880,

before Fowler, Judge; Powell, Harris and Curling, N.A. Master to blame for want of proper seamanlike care when navigating his vessel in a fog. Certificate suspended for three months.

556. *Belmont*, ship; built at St. John's, New Brunswick, 1840; owned by Mr. J. P. Rogers, London; tonnage, 891; Cardiff to Rio Janeiro; coal; abandoned at sea, February 19, 1880. Inquiry held at Plymouth, March 24, 1880, before Moore and Jackson, Justices; Forster and Castle, N.A. Abandonment justifiable.

557. *Strathnairn*, barque, and *Edith Hough*, s.s.; the former built at Tayport, 1876; owned by Mr. W. Thomson, Dundee; tonnage, 698; London to Adelaide; general cargo; the latter built at Seacombe, 1869; owned by Mr. S. Hough; tonnage, 565; left Cardiff with a cargo of coals; in collision, off Ushant, February 13, 1880, whereby the *Strathnairn* foundered, and loss of life ensued. Inquiry held at Liverpool, March 27, 1880, before Raffles, Judge; Grant, Parfitt and Wilson, N.A. Casualty due to the default of the chief mate of the *Edith Hough* in not seeing that an efficient look-out was kept. Certificate suspended for six months.

559. *Mistress of the Seas*, ship; built at St. John's, New Brunswick, 1861; owned by Mr. William Buchanan and others; tonnage, 1,740; Philadelphia to Bremerhaven; petroleum; abandoned at sea, February 15, 1880. Inquiry held at Greenock, March 20, 1880, before Neill and Ross, Justices; Curling, Pickard, and Harris, N.A. Abandonment justifiable.

560. *Constance*, s.s.; built at Whitby, 1874; owned by Mr. Thomas Pyman and others; tonnage, 635; Cardiff to Malta; coals; foundered February 9, 1880. Inquiry held at Middlesborough, March 22, 1880, before Coleman, Judge; Forster and Castle, N.A.; May, E.A. Casualty due to the vessel being overladen and to want of stability, owing to a large quantity of cargo being carried above the maindeck. Owners ordered to pay to the Board of Trade £100 towards costs.

561. *Dorothy Thompson*, barque; built at Sunderland, 1866; owned by Mr. John Tully and others; tonnage, 410; the Tyne to Cannes; coal; abandoned off the Lizard, February 16, 1880. Inquiry held at Sunderland, March 24, 1880. Vessel lost by

being thrown on her beam ends by a sudden squall, from which she never recovered. Master's certificate not dealt with.

563. *Paragon*, barque; built at Liverpool, 1837; owned by George B. Sully, of Bridgwater; tonnage, 419; Doboy, Georgia, to Drogheda; timber; abandoned at sea, February 23, 1880. Inquiry held at Swansea, March 30, 1880, before Fowler, Judge; Harris and Curling, N.A. In the circumstances, abandonment justifiable.

564. *Kensington*, s.s.; built at Low Walker, 1878; owned by Mr. E. H. Watts and others; tonnage, 908; Liverpool to Havannah; coal; supposed to have foundered at sea. Inquiry held at Westminster, March 25, 1880, before Rothery, Wreck Commissioner; Ward and Ronaldson, N.A., Merrifield, E.A. Court held that the vessel was overladen when she left; that she was faulty in build, and consequently wanted stability; and that the means of ventilation were insufficient.

565. *Marlborough*, s.s.; built at Sunderland, 1878; owned by Mr. D. P. Garbutt; tonnage, 1,498; Cardiff to Genoa; coals; supposed to have foundered at sea. Inquiry held at Poplar and Westminster, March 23, 1880, before Rothery, Wreck Commissioner; Ronaldson and Ward, N.A., Merrifield, E.A. Court found that the vessel was overladen; that she was insufficiently manned; that she wanted stability; and that the load-line was not in proper position. Owner ordered to pay to the Board of Trade £250 towards costs.

568. *Wanderer*, brigantine; built at St. John's, N.B., 1870; owned by Mr. G. F. Smith and others; tonnage, 404; St. John's to Barcelona; deals; abandoned at sea, February 19, 1880. Inquiry held at Liverpool, March 22, 1880, before Raffles, Judge; Parfitt and Wilson, N.A. Abandonment justifiable.

Official Inquiries Abroad.

533. *Bronzewing*, schooner; lost at Port Macquarie. Inquiry held at Sydney, January 12, 1880. Master free from blame.

534. *Agnes Irving*, s.s.; wrecked at Macleay River, December 5, 1879. Inquiry held at Sydney, January 8, 1880. Master to

blame for taking the bar at half-ebb. Certificate suspended for three months.

535. *Jane Anderson;* stranded whilst being towed over Manawatu Bar, December 22, 1879. Inquiry held at Foxton, New Zealand, December 30, 1879. Master free from blame.

539. *Margaret,* ketch; lost near Black Point. Inquiry held at Sydney, January 12, 1880. No evidence on which to found a charge against the master.

541. *Hindustan,* s.s.; lost near Sadras, Coast of Madras, October 21, 1879. Inquiry held at Madras, November 12, 1879. Casualty caused by an error of judgment on the part of the master.

545. *Brisbane,* s.s.; stranded on an unknown coral reef, in Arafura Sea, January 15, 1880. Inquiry held at Singapore, January 24, 1880. Casualty due to the reef not being shown on the Admiralty charts.

546. *Mary,* schooner; lost on Najinate Rock, Nagasaki. Naval Court held at Nagasaki, February 4, 1880. Master guilty of error of judgment. Ordered to pay £2 costs.

547. *Escambia,* s.s.; stranded in the Red Sea, November 28, 1879. Inquiry held at Aden, December 13, 1879. Casualty due to errors in compasses. Master free from blame.

551. *Albyn,* brigantine; foundered at sea. Naval Court held on board H.M.S. *Minotaur,* March 16, 1880. Casualty caused by the vessel springing a leak. Master free from blame.

558. *Genitiv,* schooner; wrecked on Farquhar Island Reefs, November 10, 1879. Inquiry held at Mauritius, February 10, 1880. Casualty due to the action of uncertain currents. Master to blame for not making due allowance for them, and was severely reprimanded.

562. *Sparrowhawk,* barque, and *Alma,* schooner; in collision in the Western Channel, Port Phillip Bay, October 21, 1879. Inquiry held at Melbourne, October 24, 1879. Mate of *Sparrowhawk* to blame. Certificate suspended for three months.

INVESTIGATIONS INTO SHIPPING CASUALTIES.

Additional Rules as to Investigations into Shipping Casualties, 1880:—

The Merchant Shipping Act, 1876, 39 and 40 Vic., cap. 80.
The Shipping Casualties Investigations Act, 1879, 42 and 43 Vic., cap. 72.

Under the authority of the above-mentioned Acts, I, the Right Honourable Hugh MacCalmont, Earl Cairns, Lord High Chancellor of Great Britain, hereby make the following general Rules:—

Short Title.—1. These Rules may be cited as the "Shipping Casualties (Appeal and Rehearing) Rules, 1880."

Commencement.—2. These Rules shall come into operation on the 21st day of April, 1880.

Interpretation.—3. In the construction of these Rules the word "Judge" shall mean the Wreck Commissioner, Stipendiary Magistrate, Justice or other authority empowered to hold an investigation into the conduct of a Master, Mate, or Engineer, or into a Shipping casualty.

Publication of Rules.—4. These Rules shall be published by Her Majesty's Stationery-office, through its agents, and a copy shall be kept at every Custom House and Mercantile Marine office in the United Kingdom, and any person desiring to peruse them there shall be entitled to do so.

Copy of Report where Certificate Affected.—2. Where the certificate of a master, mate, or engineer has been cancelled or suspended, the Board of Trade shall, on application by any party to the proceedings, give him a copy of the report made to the Board.

Appeals.—6. Every appeal under Section 2 of "The Shipping Casualties Investigations Act, 1879," shall be subject to the conditions and regulations following, namely:—(a) The appellant shall, within seven days after the day on which the decision appealed against is pronounced, serve on such of the other parties to the proceedings as he may consider to be directly affected by

the appeal, notice of his intention to appeal, and shall also, within two days after the appeal is set down, serve on the said parties notice of the general grounds of the appeal. (*b*) If the appeal is brought by any party other than the Board of Trade, the appellant shall give such security, if any, by deposit of money or otherwise, for the costs to be occasioned by the appeal, as the Judge from whose decision the appeal is brought, on application made to him for that purpose, may direct. (*c*) The appellant shall, before the expiration of the time within which notice of appeal may be given, leave with the officer for the time being appointed for that purpose by the Court to which the appeal is brought (in these Rules referred to as the Court of Appeal), a copy of the notice of appeal, and the officer shall thereupon set down the appeal by entering it in the proper list. (*d*) The Court of Appeal shall be assisted by not less than two Assessors, to be selected in the discretion of the Court, having regard to the nature of each case, from either or both of the following classes:—1. Elder Brethren of the Trinity House. 2. Persons approved from time to time by the Secretary of State as Assessors for the purpose of formal investigations into shipping casualties, under Section 30 of the "Merchant Shipping Act, 1876," and Sub-section 1 of Section 3 of the "Shipping Casualties Investigations Act, 1879." (*e*) The Court of Appeal may, if it thinks fit, order any other person or persons, body or bodies, other than the parties served with the notice of appeal, to be added as a party or parties to the proceedings for the purposes of the appeal, on such terms with respect to costs and otherwise as to the Court of Appeal seems meet. (*f*) Any party to the proceedings may object to the appearance on the appeal of any other party to the proceedings as unnecessary. (*g*) The evidence taken before the Judge from whose decision the appeal is brought shall be proved before the Court of Appeal by a copy of the notes of the Judge, or of the shorthand writer, clerk, secretary, or other person authorized by him to take down the evidence, or by such other materials as the Court of Appeal thinks expedient; and a copy of the evidence, and of the report to the Board of Trade containing the decision from which the appeal is brought, and of the notice of

the general grounds of the appeal, shall be left with the officer for the time being appointed for that purpose by the Court of Appeal before the appeal comes on for hearing. For the purpose of this Rule, copies of the notes of the evidence and of the report shall be supplied to the appellant, on request, by the Judge or other person having charge thereof, on payment of the usual charge for copying. (*h*) The Court of Appeal shall have full power to receive further evidence on questions of fact, such evidence to be either by oral examination in Court, by affidavit, or by deposition taken before an Examiner or Commissioner. Evidence may also be given, with special leave of the Court of Appeal, as to matters which have occurred since the date of the decision from which the appeal is brought. (*i*) The Court of Appeal shall have power to make such order as to the whole or any part of the costs of and occasioned by the appeal as may seem just. (*j*) Subject to the foregoing provisions of this Rule, every appeal shall be conducted under and in accordance with the general rules and regulations applicable to ordinary proceedings before the Court of Appeal to which it is brought; but there shall not be anything in the nature of pleadings, other than the notice of the general grounds of the appeal, except by special permission of the Court of Appeal. (*k*) On the conclusion of an appeal, the Court of Appeal shall send to the Board of Trade a report of the case similar to that required to be sent by the Judge from whose decision the appeal is brought.

REHEARINGS BY ORDER OF BOARD OF TRADE.—7. (*a*) Where the Board of Trade direct a rehearing under Section 2 of the "Shipping Casualties Investigations Act, 1879," they shall cause such reasonable notice to be given to the parties whom they consider to be affected by the rehearing as the circumstances of the case may, in the opinion of the Board of Trade, permit. (*b*) The provisions distinguished as (*d*), (*e*), (*f*), (*g*), (*h*), (*i*), (*j*), and (*k*) of the last foregoing Rule shall apply to a rehearing as if it were an appeal, and as if the Court or authority before whom the rehearing takes place were the Court of Appeal.

CAIRNS, C.

Dated this 17th day of April, 1880.

Additional Rules as to Investigations into Shipping Casualties, 1880.

The Merchant Shipping Act, 1876, 39 and 40 Vict., cap. 80.
The Shipping Casualties Investigations Act, 1879,
42 and 43 Vict., cap. 72.

39 and 40 Vict., cap. 80, s. 30.

Whereas by Section 30 of "The Merchant Shipping Act, 1876," it was provided as follows:—"The Wreck Commissioner, Justices, or other authority holding a formal investigation into a Shipping casualty, shall hold the same with the assistance of an Assessor or Assessors of nautical, engineering, or other special skill or knowledge, to be appointed by the Commissioner, Justices, or authority out of a list of persons for the time being approved for the purpose by a Secretary of State. The Commissioner, Justices, or authority, when of opinion that the investigation is likely to involve the cancellation or suspension of the certificate of a Master or Mate, shall, where practicable, appoint a person having experience in the Merchant Service to be one of the Assessors."

42 and 43 Vic., cap. 72, s. 3 (1).

And whereas by Section 3, Sub-section 1, of the "Shipping Casualties Investigations Act, 1879," it was thus enacted:—"3. (1.) The list of persons approved as Assessors for the purpose of formal investigations into Shipping casualties shall be in force for three years only, but persons entered in any such list may be approved for any subsequent list. The list of those persons in force at the passing of this Act shall continue in force until the end of the year 1880, but nothing in this section shall affect the power of the Secretary of State to withdraw his approval of any name on any such list or to approve of any additional name."

And whereas the Secretary of State has directed that the Assessors shall, so far as in his opinion circumstances permit, be taken in order of rotation within each class or sub-class, and has further directed that the Assessors placed by him on the list of Assessors shall be classified according to the qualifications set forth in the additional Rules as to Investigations into Shipping Casualties, dated the 20th day of December, 1879.

And whereas the Secretary of State has further directed that the following qualifications with respect to Class II. Mercantile Marine Engineers, shall be substituted for the qualifications set forth in the said Rules, viz.:—

QUALIFICATIONS.—CLASSES.—CLASS II.—MERCANTILE MARINE ENGINEERS.—Five years' service as an Engineer in the Merchant Service, and, at the time of appointment, holding a first-class certificate of competency as an Engineer.

Now, under the authority of the above-mentioned Acts, I, the Right Honourable Hugh MacCalmont, Earl Cairns, Lord High Chancellor of Great Britain, hereby make the following general Rules:—

COMMENCEMENT.—1. These Rules shall come into operation on April 19, 1880.

PUBLICATION OF RULES.—2. These Rules shall be published by Her Majesty's Stationery office through its agents, and a copy shall be kept at every Custom House and Mercantile Marine office in the United Kingdom, and any person desiring to peruse them there shall be entitled to do so. 3. "The Shipping Casualties Rules, 1879," shall be read and construed, and shall take effect, as if the qualifications above set forth with respect to Class II. Mercantile Marine Engineers had been inserted in the said Rules in lieu of the qualifications therein specified.

CAIRNS, C.

Dated this 19th day of April, 1880.

THE

NAUTICAL MAGAZINE

FORTY-NINTH YEAR.

VOLUME XLIX.—No. VI.

JUNE, 1880.

THE STABILITY OF YACHTS.

FOR many years past the charge has been made against successful yacht designers that they produced mere "racing machines;" we fear that at present the accusation is as just as ever it was, and that recent, like all former fresh departures, only represent the last successful mode of "cheating tonnage." While such is the conclusion to which we are forced by a consideration of the leading features of the yachts of the last few years, we think we can descry a promise of better things in the fact that leading men in the yachting world are turning their attention to the theory of naval architecture, and endeavouring to apply it in yacht design. Mr. Dixon Kemp, in whose admirable work on Yacht Construction the principles of naval architecture were first used in a discussion of that question, has this year contributed an able paper to the Institution of Naval Architects on the stability of yachts. He begins with a brief notice of the general subject, adverting to the fact that, "A very few years ago nothing was understood about the stability of yachts farther than that an increase of beam in a certain way made a yacht stiffer, that shifting ballast to windward would do so, and recently, when this was prohibited, the discovery was made that putting metal on the keel would also add largely to

stiffness." Now and then the metacentric height was calculated, but nothing more. In the last few years, however, the curve of stability has been got out in several instances before the design was finally approved, so that in comparing various designs now, we are able, not only to know their initial stability, but what may be expected of them at various angles of inclination. The bulk of Mr. Kemp's paper is occupied by a detailed comparison of three vessels showing successive stages in the development of the modern yacht, the last being the *Jullanar*, which is an extreme case of a kind of vessel unknown and probably unimagined twenty years ago.

It may be as well for us to preface our remarks upon the facts brought out in Mr. Kemp's paper by some observations upon the general question. The ability of a vessel to stand up under sail depends largely upon her initial stability, and this is measured by the height of her metacentre above the centre of gravity. The absolute height of the metacentre in the ship is increased as the breadths at the load water line are increased relatively to the load displacement. The design of a vessel may consequently be modified to give her greater stability by increasing the breadths at the water line, or by decreasing the immersed volume. Increase of stability may also be obtained by lowering the position of the weights, the same form being retained. In the successful yachts of thirty years ago, notably in American yachts, great stability was obtained by great beam; in modern English yachts great stability is obtained by the use of lead ballast, carried as low as possible, some of it in the shape of a lead false keel. When initial stability is obtained by great beam there is the disadvantage that it is lost at moderate angles of inclination. This is easily seen if we consider the comparatively small angle at which a vessel of large beam is inclined when the edge of her deck is awash. Comparing a yacht of, say 20 ft. 6 in. beam, which has a freeboard of 3 ft. 5 in., with another of nearly the same size altogether, but of only 17 feet beam, it will be seen that if the former is inclined to such an angle that the edge of her deck is at the water, and the latter is inclined to the same angle, only 2 ft. 9 in. of her freeboard has disappeared; so that if, when upright, they both

had the same clear side, the narrower vessel would have eight inches left when inclined. In the case in point, the narrower not only has the same original freeboard, but considerably more, and thus we see that large freeboard and small beam assist each other in lengthening the range of stability. As a matter of fact there are yachts in existence of small beam and small initial stability, but yet uncapsizable. In addition to their safety, it must be remembered that these vessels can carry a large press of sail in rough weather, a valuable qualification for racing at times. On the other hand their initial stability being small a light wind gives them a comparatively large heel, and the great weight of lead ballast necessitates increased displacement, thus introducing more resistance to progress through the water.

The three yachts dealt with in Mr. Kemp's paper, are the *Rose of Devon*, the *Florinda*, and the *Jullanar*, vessels of about the same size, of which the first and third were built by the well-known Mr. John Harvey, of Wivenhoe. The *Florinda* is in some respects of an intermediate type.

Jullanar is 100 ft. long, 17 ft. beam, and has a draught of water amidships of 14 ft., her displacement being 158 tons.

Florinda is 86 ft. long, 19 ft. 8 in. beam, 11 ft. draught, and 150 tons displacement.

Rose of Devon is 81 ft. long, 21 ft. beam, 10 ft. draught, and only 128 tons displacement.

A significant comment upon the characters and success of the yachts would be obtained by comparing their racing tonnage with these dimensions. Mr. Kemp does not give it, nor does he give the linear dimensions necessary to its calculation, but from another source we have obtained the racing tonnage for two of the vessels. The little *Rose of Devon* has a racing tonnage of 148, and the *Jullanar* only 124.* We shall return to this part of the subject farther on.

Mr. Kemp first compares the three vessels on the supposition that they were ballasted with iron, as most yachts were a few years ago. *Rose of Devon* has the greatest initial stability of the

* Under another rule the *Jullanar* measures 136 tons.

three, but her maximum stability is reached at an angle of about 40 degrees and then decreases rapidly. The *Florinda* has the same maximum stability, but less stabiliy at small angles of heel, while the *Jullanar* is found to have very little at small angles; at an angle of 30 degrees her stability is as much as that of the others, and it goes on increasing up to 70 degrees, at which inclination she has double the righting power that they had at 20. The comparison between the yachts is favoured by the fact that their area of lower sail is pretty nearly the same in each case, being about 5,000 square feet. In a strong breeze, when the whole lower canvas would be carried, assuming that the wind blew at about 15 knots per hour, there would be a pressure of 2·5 lbs. to the square foot. This would send *Rose of Devon* to 24 degrees, *Florinda* to 40 degrees (her upsetting point) and *Jullanar* to 32 degrees. This calculation is based on the false assumptions that the sails are trimmed fore and aft and that the wind pressure is at right angles to the sail plane; moreover, in practice the wind pressure is found to be very much less than that taken. Mr. Kemp, however, thinks it "by no means impossible that a yacht may be so situated as to get the full force of the wind on her broadside, with sails trimmed flat when at anchor, or from a sudden veering or breezing up of the wind," and remarks upon the case of an American yacht, the *Mohawk*, of 30 feet beam, which capsized at anchor. On this special point, that the effect of a sudden gust of wind upon a vessel's stability is making her heel over so rapidly that the momentum generated in the first part of the heeling causes her to roll beyond the angle to which a steady pressure of the same amount would incline her, until the momentum is extinguished, when she returns, and after some oscillations, comes, at last, to the angle corresponding to the steady wind pressure,—we would remark that the dynamical stability of vessels has been made the subject of mathematical investigation, with the result, that in most cases of vessels of ordinary form a wind force which would, as a steady pressure, heel the ship over to a given angle, would, when suddenly applied, send her over to twice that angle. This rough statement would not apply to extreme angles, especially in the cases of yachts, but for

any vessel the curve of dynamical stability may be easily obtained from the elements of the curve of statical stability.

The effect of a "pleasant breeze" of one pound per square foot pressure, is next considered, each yacht being supposed to have her whole lower canvas set. This would heel over *Rose of Devon* 9 degrees, *Florinda* 12 degrees, and *Jullanar* 14 degrees, thus showing that *Jullanar*, when ballasted with iron only, would be an unpleasantly crank vessel; in fact, much too crank for a cruising yacht.

Coming now to the actual condition of the vessels, the two last are ballasted with lead, and have also lead on their keels, *Jullanar* having as much as 79½ tons of lead ballast, of which 6 tons is on her keel. *Jullanar* has, of course, larger initial stability than before, but is still behind *Rose of Devon* in this respect, while her range of stability is practically unlimited, so that she is uncapsizable while water is kept out of her hold. Mr. Kemp thus sums up his conclusions:—"The one-time popular idea was that a vessel to behave well and to be generally easy in a seaway must have great beam in proportion to her length, and that she must not have a large displacement if such necessitated the carrying of a great weight of ballast. It would seem, however, from the performances of recently constructed yachts that good sea-going qualities are compatible with a low situation of the centre of gravity, provided the metacentric height is not great, or in other words, provided the initial stability is not great. Length and depth are the properties on which ease and comfort in a seaway chiefly depend, and the general outcry against long and narrow yachts arose from the insufficiency of the depth they were given, and from a fear of ballasting them entirely with lead." Further, *Jullanar* is not after all an extreme type, seeing that during the past winter two 90 ton yachts have been built, each having as much as *thirty tons of lead on her keel.*

The last statement is enough of itself to convince us that modern yacht design produces eminently unsatisfactory results. True, the new vessels are uncapsizable; bad seamanship or foolhardiness can do nothing worse than carry away sails and masts. In this connection we may remark that it came out in the discus-

sion upon Mr. Kemp's paper, that in the American yacht referred to as having capsized at anchor, the weights on board shifted, and water also got inside, while it may be said that she had a fair range of stability, or what would be considered such for an ordinary sailing ship. It will probably be found that most yachts of the old type have such a range of stability that if sailed with ordinary care and judgment they are practically safe, and we may add that, care and judgment wanting, disaster will come, even to a vessel whose range of stability is unlimited. The new yachts have the further merit that in rough weather they would fairly beat an old-fashioned yacht of the same size. Their chief excellence, however, and, in fact, their *raison d'etre*, is that their peculiar construction gives a small racing tonnage in proportion to their actual size. Thus, as we before remarked, *Rose of Devon*, with a displacement 30 tons less, has a racing tonnage 24, or, at least, 12 more than *Jullanar*.

The rule for tonnage which has for years been that of the Thames Yacht Club and which is used by Lloyd's Yacht Register in determining scantlings, is :—

$$\frac{(L - B) \times B \times \frac{1}{2} B}{94}$$

L being the length from fore-side of stern to afterside of post measured on the range of the upper deck, and B the extreme breadth of the vessel. Excessive lead ballast being put out of the question, this would be a fair rule, giving as it does a rough comparison of the capability of standing up under sail. We cannot recommend register tonnage as a basis for time allowance, on the contrary, we believe that if it were applied bad results would follow, indeed worse than the present state of things; low freeboard would be encouraged with consequent loss of range of stability, and excessive fineness of lines would also be induced. The former of these evils would result from the general adoption of a rule such as that used for a time by the New Thames Yacht Club, and depending upon the product of the length, breadth, and depth of the vessel, the latter would be facilitated by using, some have proposed, the displacement as the basis of tonnage surement. We believe that the rule which would afford, all

things considered, the best basis for time allowance, and would open the door for the smallest amount of evil evasion, would be to take the product of length (at or under the water line), beam, and mean draught. We proposed this rule six years ago* when "all lead" ballast began to take an important position, and we believe it would be a fair and practicable method of measurement and would be less easily evaded than any at present in use. The chief defect of the present rule is that it omits depth altogether. When yachts had little ballast, depth was not an element of stability, now it is a most important element, and so long as it is omitted from the account, so long will builders be induced to decrease the breadth and make up for consequent loss of stability by enormous quantities of lead ballast placed as deep as possible. Constant complaints are being made about yachts of the present fashion, and numerous evil qualities are ascribed to their deep lead keels. It is said, for instance, that in places where vessels have to take the ground, the yachtsman must either obtain a craft which, although possessing good sailing qualities, is of such proportions as to place her quite out of the running in a race under existing rules, or he must be prepared for endless trouble and expense.

It may be that, after all, the best and fastest kind of yacht will ultimately be found in an intermediate type. We must not be understood to advocate beam at the expense of depth, to do that would be worse than the contrary error; we only say, give beam and depth both fair play, and experience will then enable yacht builders to hit the best proportion. It is really of the first importance that some fair, and at the same time practicable rule of measurement should be adopted, if only to set free the energy and ingenuity now spent in devising means of cheating tonnage, for employment in honest improvement of the designs of yachts.

* *Nautical Magazine*, 1874, page 458.

THE "ATALANTA."

THE *Atalanta* has disappeared in a more mysterious manner than the *President*, the *Pacific*, or the *City of Boston*. All these vessels ran in the track of icebergs, and at a season of the year when bergs and field ice were known to be drifting unusually early from Davis Straits southward. In the Admiralty Chart of 1873, it was, and I believe still is stated, that field ice is found on the Banks of Newfoundland from March to July, and yet in January, fields, whose limits cannot be seen from the lofty masts of an Atlantic mail steamer, are frequently passed. My first experience of this occurred on the 27th of that month. The night was clear, a brilliant moon lit up the distant horizon and the dead blue water of the Banks with unusual distinctness. The wind at the time was blowing strong from the north-west, and the sea being smooth the ship was averaging fifteen or more knots an hour, under single reefed topsails and courses. At five o'clock in the morning from the hurried entrance of the officer of the watch into the wheel-house, and the stopping of the engines, I inferred that something unusual had occurred. "Field ice a-head, sir, and on both bows as far as it can be seen." "I think you must have made a mistake Mr. W." "No, I am positive." "Very good, wait till I see for myself before doing anything." In a few seconds a glance from the bridge assured me of the correctness of the officer's report, and that caution was necessary. By daylight the edge of the field was reached and carefully entered, but the experience gained on that day, before again emerging into clear water, was such that nothing but sheer necessity could induce me to enter another in an ordinary ship. Many of the lumps were twenty feet high, and notwithstanding that the utmost care was exercised in avoiding suspicious looking pieces, the ship shook under the effects of cutting through portions which could not be avoided. Now had a dense fog prevailed, it is quite probable that the first intimation of being near would have been the shock experienced on entering

the field, but it is noteworthy that fog seldom hangs over ice in this locality. A Danish shipmaster who was on board related the following anecdote in connection with the loss of the *City of Boston*. It appears that he was making the northern passage, and, at a season of the year when he expected to find a sea clear of field ice, he suddenly found the ship surrounded with it, and on the northern horizon a steamer slowly groping her way. On comparing the position of this steamer with that due to the run of the *City of Boston* from Halifax, he was led to believe that she was the same. Such a conclusion cannot be accepted without much reservation, but it unquestionably proves that at the time an unexpected and unlooked for danger was in her track, one which occasionally baffles the skill and caution of the most watchful of commanders.

There is not the slightest ground for inferring that any traces of the *Atalanta* will ever be found in the region of ice, and the statement of her drifting to a high northern latitude can only emanate from those who are not thoroughly conversant with the set and velocity of the Gulf Stream on her presumed track. It would indeed be singular to find the captain of a man-of-war shaping a course which not only sailing ships but steamers, when possible, avoid in winter. Captain Stirling had many inducements to keep to the southward; a genial temperature, a ship's company recently suffering from fever, and a strong easterly current being the most prominent. Apart, however, from all public and professional reasons, his letter to his wife furnishes ample testimony that he expected and intended, if possible, to make a rapid passage to Spithead, and the assumption, when the season of the year is taken into consideration, fully justified him in predicting it.

The track between the Bermudas and the meridian of the Azores is probably beset with more dangers to navigation than any other part of the globe, not the least being the abandoned timber ships sailing out of American ports. From Quebec to Pensacola, it is the custom to keep well to the southward, but ships from the latter port keep within the limits of the Gulf Stream as long as there is any perceptible drain to the eastward. The Wreck Register shows that many are abandoned before attaining the latitude of Cape

Hatteras, and then become more dangerous to the mariner than the advent of a new shoal. When their upper works are carried away by the force of the sea, the remaining portion of the hull is often little more than awash, and on a dark, tempestuous night, the keenest eyesight is unable to detect the hidden danger. A wreck packed with logs of pitch pine would, if struck at a high rate of speed by a sailing ship, most certainly start the wood ends, if it did not flatten in the bows, and we all know that it does not take a rent as wide as a barn door to prove fatal under such circumstances. That great safeguard of an iron ship, the collision bulkhead, is absent in a wooden vessel, and the water would have free access to the hold by the rent. The sequel is not difficult to imagine, for human skill and courage would be alike powerless at such a moment, especially in a ship of the type of the *Atalanta*, whose rolling propensities might prevent a boat from being successfully lowered in time to clear the wreck. The testimony of John Virling on this head is of no practical value, for from a cause which cannot be easily explained, the evidence of common (excuse the word) seamen on points of seamanship is seldom reliable, and when dressed up in the language of a reporter, whose profession it is to be sensational, doubts become certainties in his highly coloured mind. On looking over my notes on a Symonite, I find that she rolled 37° each way, possibly more, for at that mark the pendulum was off the arc, and the sea spooning over the lee rail. In recording these observations, it is proper to state that the momentum communicated to the instrument by the roll of the ship, probably caused it to record measurements in excess of what they really were.

There are not many loose fittings on the deck of a British frigate to furnish a clue for a successful search, unless the precise spot where she foundered is known, and it is, therefore, not likely that any vestiges of the disaster will ever be identified. The above possible cause of loss is only one of many, for the life of a ship. like the life of a man, may be taken in many ways; fire, the sudden springing of a leak, the thumping of a broken mast under the counter, filling through a stove port, and lastly, from being ..en by the lee. The great winter gales which blow around

Bermuda are generally, if not always, of the revolving type, and the barometer does not at all times indicate the force of wind which often follows the inevitable shift from south-west to north-west, thus vessels steering to the north-east find their sails taken by the lee with all the force of a hurricane. In a heavy cross sea a sailing ship cannot be placed in a more dangerous position, her safety almost depends on the prompt action of the helm before the way is lost, and if either officer or helmsman fail to appreciate the position, a stern board, with possibly fatal consequences, is the inevitable result.

My experience of one of these revolving gales will not readily be forgotten by myself or anyone who was present. The ship had commenced loading grain in Baltimore, and to avoid being neaped was taken clear of the channels to fill up, but had scarcely commenced, when without the slightest warning the ice on the Susquehanna River suddenly broke up, and drifting down in huge fields prevented the lighters from communicating between the ship and the city, thus shutting out the last hundred tons of maize. This loss of freight was at the time looked on as a grave disaster, but later on all allowed that it saved the ship from foundering. Being rather short-handed, no uncommon circumstance a few years back in American ports, and very heavily sparred, unusual precaution was rendered compulsory. Fortunately the topsails were fitted with patent reefing gear, which rolled them up like a window blind, almost obviating the necessity of the hands going aloft to furl in ordinary weather. This invention is a positive luxury to seamen, annually saving valuable sails and still more valuable lives. That it does not look so well as the single yard is undeniable, an objection which, coupled with the additional weight, has in some measure, doubtless told against their more general introduction in ships whose stability is questionable with certain cargoes.

After leaving Cape Henry the usual Atlantic March weather was encountered in the shape of gales from east round southerly to north-west, with squalls of hail, snow, and an ugly sea, literally running in heaps, but all went well until the forty-fourth degree of west longitude had been attained. One of the usual breezes

had begun in the south-east, and as it drew aft the square sails were let fall and sheeted home. The barometer, although falling slowly, showed no indications of what subsequently followed, but the unusually deep square foresail was so difficult to handle with a reduced ship's company, that it was furled, notwithstanding a hint from the chief officer that it was inexpedient with a fair wind. Singular to relate, this fine specimen of a rising English officer and seaman was lost five years afterwards when in command of a steamer on the same route, and not a vestige of any part of the fittings or hull of his vessel was ever found to indicate her fate.

A correspondent of a London paper at Portsmouth has recently written rather flippantly on the impossibility of "wiping out" all traces of the existence of such a frigate as the *Atalanta*, yet experience proves that a fleet might founder and leave no clue of the disaster behind them, unless someone gifted with great strength of mind, whose affection the certainty of death could not daunt, had, to apprise those he was leaving for ever, written a hasty message with a hope that it might some day indicate how he perished. Our only course is, therefore, to wait patiently till the sea perchance gives up a message, for it is not likely that it will give up anything else. There are many reasons to account for this seemingly mysterious disappearance on the Atlantic. Few articles bear the name of the ship, steamers will not stop to examine an oar or a lifebuoy, and in the majority of sailing-ships the feat of getting a boat into the water, unless for some very special purpose, such as a man overboard, is rarely entertained. Finally, barnacles and seaweed soon conceal from a passing eye signs of recognition which, under more favourable circumstances, might attract attention.

To resume the thread of my narrative. I may add that, as darkness shut down, it became evident from the appearance of sea and sky that the precautions which had excited the comments of my trusted officer had not been taken too soon. In addition to the ordinary haziness of a southerly wind there was an unusual k shadow in the north-west, a something that was not tangible, whose presence was felt by the weather-wise to bode evil.

Several hours passed away, the wind increased, the shadow still hung in the sky, there was scarcely a perceptible fall in the barometer, doubtless due to the nearness of the heavy north-west current, and the general impression was that only an ordinary equinoxial gale was brewing. Notwithstanding this feeling the topsails were reefed down, and the remaining sails, with the exception of a new reefed main-staysail, secured. By midnight the sea and wind had risen to the dimensions of a gale, and the green water rolled over the rails on either side in such quantities that it was decided to run no longer. The fore-topsail was rolled up and secured, the main taken in hand, but before the clews could be made fast the gale shifted from south-west to north north-west, without any perceptible break in the sky, with the force of a hurricane. So strong was the squall that it was impossible to look to windward and breathe, to send a man aloft, or even to stand without holding on by the rails. Although the steamer, from her great beam, possessed unusual stability, she listed over under the impulse of the shock, immersing the lee bulwark and filling the waist with water. The main-staysail, with a roar that could be distinctly heard over the gale, blew bodily out of the bolt rope, and when daylight broke a few frayed particles on the lee fore-brace was all that remained of a sail which it had not been unreasonably assumed was capable of resisting the heaviest gale. The loss reminded me of the lines in "Rokeby :"

> "And canvas wove in rattling looms
> To brave the storm no more presumes."

As it was necessary to come to the wind, the sudden shift had brought the south-west sea somewhat on the beam, which consequently rolled in to leeward, and, by the weight of water, aided the wind to press that side at every lurch down to the coamings of the hatchways, thus destroying the spare buoyancy and allowing the rising wave due to the shift of wind to break over forward. It was a critical moment, and if long continued it was impossible the ship could have lived through the night, something must have yielded from the swash of water across the deck that followed every roll. The chief engineer was a splendid fellow, an old

follower, one of the class who cannot be too highly appreciated, and the next morning, when the danger was over, he said to me, "As we lay down so unusually I left the engine-room to see what was wrong, and from the cylinder platform, looking through one of the side lights, saw the waist was full of water. I did not think we had a chance of life, but knowing that you would do as much as possible, I said to myself if we do founder my place is to go down by the engines."

I believe that the force of the wind eventually saved the ship. The south-west swell was blown bodily down, or sent in showers of spoondrift to leeward, its momentum being quickly absorbed by the long rollers from the north-west, and before they had attained their greatest altitude the ship had only a fair breaking sea to contend with. Nevertheless, it was an anxious night, rendered worse by intense darkness, for the shift of wind had in no wise blown off that dark shadow which now covered the whole of the sky. As the big waves bore down, and their white crests broke over the hull or swept harmlessly by, it made one hold his breath till re-assured that no damage had been done. The greatest force of the wind did not last more than three hours; indeed, as an old sailor remarked, nothing could live if it blew "so strong" for twenty-four hours.

I have on more than one occasion discussed our marvellous escape from foundering on that eventful night, and always attributed it to the fact of having been forced out of the Chesapeake before the loading was completed. As the last straw is said to break the camel's back, the addition of another hundred tons of dead weight would certainly have swallowed up the small amount of surplus buoyancy which at one time remained. It may not be out of place to here remark, that shipowners and shipbuilders sometimes render all scientific knowledge and experience of no practical value by often constructing huge *culs de sac* for the sea to lodge in, thus the properties of a ship on smooth water form no guide to her behaviour in a gale.

I have often pictured to myself the fate of a sailing ship with a ...ir spread of canvas set, had she been taken by the lee in a ...r manner with no more warning than was vouchsafed to us;

it would have been one of two things, the masts or the ship would have gone, probably both, for in no other position is she so helpless, or so liable to develope a weak point by staving a stern post and filling below, or starting a butt by striking on the wreck of her masts. To suspect that the *Atalanta* foundered in this manner in no wise impugns the reputation for seamanship of her captain and officers (who are alleged to have had unusual experience), especially when the rolling qualities of Symonites in general are given due consideration, for, with green seas coming over the lee netting and a hurricane to windward, not much can be effected by the best of crews.

In what manner, if not as related, did the five vessels named in the *Shipping Gazette* mysteriously disappear on the same track during the month of February. We cannot suppose that collision or fire caused the loss of all, such a decision would be unreasonable. As has been before stated a well stowed timber ship is a great danger to navigation; let, therefore, every abandoned vessel on the Atlantic be carefully scrutinised in order to ascertain if traces of a collision are visible. If one has occurred with the *Atalanta*, a block, a piece of rope, a nail, or a plank may unravel the mystery which now enshrouds her fate. The setting on fire of derelicts would leave an opening for fraud, but it appears a singular anomaly that the lives of seamen and passengers should be daily risked, because there are a few unprincipled men in the world whom the law cannot keep in order.

As a contemporary remarks, whenever an accident occurs to a man-of-war the public make an unreasonable clamour, and require someone's blood to appease their wrath, regardless of who he may be. The loss of two large training-ships within so short a time of each other is certainly deplorable and unlooked for, but the experience gained by the first accident was naturally applied to guard against the second, and to hint otherwise without forthcoming proof, places the Admiralty and dockyard officials in a most unmerited position.

The conditions under which the *Atalanta* left Bermuda rendered capsizing an impossibility, unless, as in the case of the *Eurydice*, the ports were injudiciously open, not a likely contingency to happen

on a passage during the worst month of the year across the stormiest belt of sea on the face of the globe. Equally futile are the criticisms on her crew. A merchant ship of her tonnage would be considered well manned with twenty-four hands all told, and there are scores of greater tonnage who cannot boast of that modest number, setting aside the heterogeneous elements of which it is composed. We know from the letter of an officer in the *Hampshire Telegraph*, who, I believe, served in her during her last cruise, that her complement of able seamen alone was forty-four, which number was certainly increased during her run in the West Indies by time-expired men. In addition to this there must have been considerably over two hundred ordinary seamen, a large proportion of whom had served in the two previous cruises.

For training purposes it must be acknowledged that a man-of-war rig is antiquated. Nothing is gained by setting aside the well-known principles of mechanics, which, when acted on, double or treble manual force. Patent blocks, manilla cordage, brace pendants and double topsail-yards come under the heading of mechanical appliances for all ships. With the latter, not only is the leverage on the masts reduced to a minimum, but the letting go of the upper topsail-halliards spills half the sail and close reefs the remainder, while the yard has no chance of jamming against I lee topmast rigging. Far different is it with the deep fore-escapd topsail of an old-fashioned frigate. When listing over in attriluall, if the halliards are let go, the yard then acts as a Cpecies of tourniquet, and cannot be got down until the weather-brace has been rounded in, and sometimes not then. All sailors know how difficult this is to be carried out in an emergency, on a dark, squally night.

In conclusion, it is my firm opinion that no trace of the missing ship will be found 50° N. to the westward of 36° W. longitude; there is, however, a bare possibility that the drift of the Gulf Stream may carry some tidings to that latitude, but far east of the cruising ground assigned to the searching squadron from Halifax.

W.

RECENT LOSSES OF IRON STEAMSHIPS.
THE CASE OF THE "CONSTANCE."

A FORMAL investigation was held at the Public Board Room, Post Office Chambers, in the Borough of Middlesbrough, on the 18th, 19th, 20th, and 22nd days of March, 1880, before E. J. Coleman, Esq., assisted by Captains Forster and Castle, and Robert C. May, Esq., C.E., into the circumstances attending the loss of the steamship *Constance* on the 9th February, 1880.

The Court, having carefully inquired into the circumstances attending the above-mentioned shipping casualty, found, for the reasons stated in the annex to their report, that the steamship *Constance* capsized and foundered at sea on the 9th day of February, 1880, owing to—

1st. That she was overladen.

2nd. That the construction of the said steamship was such that she did not possess sufficient stability for the carriage of the weight of coals on board, especially in reference to the large quantity of coals carried above her main-deck.

The annex to report states that "the *Constance*, official number 67,533, was a screw steamer, built in 1874 at Whitby, by Messrs. Thos. Turnbull and Sons, and was owned by Mr. Thomas Pyman and others, of West Hartlepool, he being the managing owner. She was registered at West Hartlepool as 224 feet long, 30 feet beam, and 17 feet deep, with engine-room 34·3 feet long.

"Under her tonnage-deck	813	tons	60
Under break-deck	81	,,	49
Topgallant-forecastle	28	,,	07
Chart-house	2	,,	23
Total ...	1,009	,,	56
Less deductions for engines and crew spaces	374	,,	11
Register tonnage ... ... tons	635	,,	45

"She was rigged as a fore-and-aft schooner. This vessel had an iron main-deck, extending from the stem to 100 feet aft, or to the fore bulkhead of the engine-room. There was a raised quarter-deck 90 feet long, extending from the after bulkhead of the engine-room to the stern-post, and 4 feet above the line of the main-deck, but there was no main-deck of any kind in this vessel other than that in the fore part of the vessel. There was a bridge 48 feet long, 7 feet high, and extending from wing to wing, and was constructed as follows:—The frames were carried up every other one, the space being 3 feet 10 inches, and plated with $\frac{7}{16}$ iron; there were no vertical stiffeners. The deck was 3-inch yellow pine deals. Under the bridge there were engineers' cabins and messroom and galley, with a coal bunker at the sides that would contain 83 tons of coal. Near the after part of this bridge-deck there was a donkey boiler weighing 4 tons, and at the sides of the bridge there were four boats (two on each side).

"The iron bulkheads were as follows, viz., one collision bulkhead, one at each end of the engine-room, and one at the after stuffing-box.

"Water-ballast tanks. The forward tank was at its fore end 18 inches and at the after end 15 inches above the floor plates, and would contain 110 tons of water. The after tank was at its fore end 2 feet and at the after end 3 feet $1\frac{1}{2}$ inch above the floor plates, and would contain 75 tons of water, thus making the two tanks contain 185 tons of water. At the time of sailing these tanks were empty.

"These tanks had gutter ways in the wings, with sluice valves opening into the engine-room. There was neither a steam or deck pump connected with the fore hold. In the after hold there were two deck pumps, but there was no steam pump.

"She had at the time of sailing a crew of 19 hands, including Mr. Henry Waller, who holds a certificate of competency, No. 84,619.

"This vessel had carried a cargo of beans on her last voyage, and her shifting boards had not been removed. They extended from the deck in each hold, and went down 8 feet.

"There were no shifting boards in the hatchways. The hatch-

ways were as follows:—Fore, 17½ feet long; main, 28 feet long; after, 19 feet long.

"There is considerable discrepancy in the evidence as to her draught of water and freeboard.

"The builder, however, who was before the Court, put in her displacement scale, and stated that he constructed her to carry 1,450 tons dead-weight, exclusive of engines and boilers.

"This he stated would give a freeboard of 1 foot 7 inches to the upper side of the iron deck, and that it would require 13 tons to put her down 1 inch.

"The cargo taken in at Penarth Docks was 1,167 tons of coal. She also received 199 tons of bunker coal, and also had remaining in her bunkers from the last voyage 10 tons of coal, making a total of 1,376 tons of coal. This is 74 tons less than she was constructed to carry.

"Allowing 13 tons displacement rise per inch, she would be 6 inches lighter in salt water, or, in other words, her freeboard would increase from 1 foot 6 inches to 2 feet 1 inch.

"The engines were of the compound direct-acting surface-condensing type, of 99 horse-power nominal, and were fitted with the usual bilge donkey and circulating pumps, and had the power of working by jet condensation by turning on the bilge injection.

"These were supplied with steam by one boiler capable of sustaining a working pressure of 75 lbs. to the square inch. Both engines and boilers were made by Messrs. Blair and Co., of Stockton-on-Tees, and they appear by the evidence to have been well fitted and designed, and in every way suitable for a vessel of the tonnage of the "*Constance*."

"On leaving Penarth they appear to have worked well up to the time of the first stoppage, and for the first portion of this period they were driven at full speed, and the latter part of the time eased down to half speed, and whilst working at this latter they appear to have suddenly stopped, the cause of which no witness that was produced could depose to.

"The engineers appear to have taken the usual steps to ascertain the cause, and to remedy it by removing the cylinder and valve case covers. After a lapse of about three hours they were again set

in motion in forward gear, and continued to work until the fires were so low that sufficient pressure of steam did not exist for driving them, shortly after which the ship foundered.

"At the moment of the engines stopping on the first occasion a heavy sea appears to have struck the vessel, carrying away all her boats and the chart-house, ripping up a portion of the bridge-deck, destroying the coal bunker hatch on the lee side, carrying away the tarpaulin on the stokehole grating, and doing other damage.

"From the list thus caused she never recovered, but remained for some hours on her beam ends in the trough of the sea, and eventually foundered as before referred to.

"The *Constance* left the port of Cardiff on the 7th of February last, bound for Malta, with 1,376 tons of coals, inclusive of those in the engine-bunkers. These were stored partly in the main-hold, partly in the fore-hold, and partly in the bunkers, two of which latter extended to the under side of the bridge-deck. The weather appears to have been moderate, and she proceeded on her voyage under full steam.

"According to the evidence of the pilot she was an extremely handy ship, answering her helm perfectly, and easily moved by her engines a-head or a-stern.

"On the 8th, the wind began to freshen, blowing from the S.S.W., fore-and-aft canvas was set until 6 p.m., when on account of the weather becoming squally all sail was taken in, the vessel was then meeting a cross sea from the N.W. and S.W.

"The engines were then eased down to half speed, the hatches were battened down and proper tarpaulins put over them.

"The second mate was in charge of the deck from 8 till 12, the captain frequently visiting it during those hours. The weather appears to have got worse, and between 11 and 12 it was blowing a full gale. The captain states that between 6 and 7 a.m. on the 9th instant he was in his cabin and awake, the engines being then working regularly, when they suddenly stopped. He went on deck at once and ordered the main trysail to be set. Whilst this was being done a heavy sea from the S.W. struck her on the port side, swept the decks, carrying away all the boats, ripping up the bridge-

deck, and throwing her on her starboard beam ends. The ship was then lying in the trough of the sea, and the captain then asked the chief engineer whether he could account for the stoppage of the engines, and he said he could not. The captain stated that when he was in the engine-room he heard the cargo in the after part of the ship shift to leeward. The engines after some delay were again started between 10.30 and 11, the fires being brightened for that purpose; they worked until 1 o'clock (but no steerage way could be got upon the vessel), when they again stopped.

"A fireman who was called said they had great difficulty in coaling the fires, as the ship was on her beam ends and steam gradually went down. Every sea that struck the ship forced her more on her broadside. Water made its appearance under the plates of the stokehole and rapidly increased, the hands were set to bailing, but could not lower the water, and they were eventually driven out of the stokehole and engine-room. Her decks were now under water on the leeside. The fires were all washed out. A signal of distress was made, and a steamer bore down upon the *Constance* and lowered a boat, which was at once smashed up. All hands were then mustered on the after deck, when the vessel taking a sudden lurch foundered throwing all hands into the water. A steamer, the *Lady Tredegar* came to their assistance and threw lines out to those who were afloat; seven were thus picked up but twelve perished. The former were subsequently landed at Bilbao in Spain.

"In the opinion of the captain the vessel was lost owing to the stoppage of the engines, and he considered that had she had sufficient engine-power at that time to put her head to sea she would have weathered the gale.

"We are sorry we are unable to agree with the captain as to the cause of this casualty, and cannot but consider that the loss of this vessel was owing to the following circumstances:—

"1st. The evidence of the builders shows that when she got into salt water her freeboard would be 2 feet 1 inch, and as the depth of hold was 17 feet thus giving 1½ inches per foot, which is in our opinion insufficient.

"2nd. Her cargo was stowed in the fore and after holds. Unfortunately the evidence did not furnish the Court with the

quantity each compartment contained, but it was stated that she would require to be very well stowed to contain 1,450 tons, and as she had 74 tons less than this quantity, we may presume there was this much space in the vessel, but where this space was situated we are unable to say; it is, however, beyond a doubt by the evidence that the side coal bunkers under the bridge, and which were 7 feet higher than the main-deck, were full, and contained 83 tons of engine coals, and so long as the vessel kept a fairly upright position there would be no immediate danger, but so soon as the pressure of wind or sea or both was brought to bear upon her she was thrown beyond a certain angle and the superincumbent weight necessarily carried her, owing to her peculiar construction, on to her beam ends and makes to all intents and purposes a wreck of her.

"It is obvious that even if the engineer had succeeded in getting the engines into working order so as to go at full speed the position of the ship could not have been changed. In the opinion of the Court if vessels of this construction are to be used for mercantile purposes they ought not to carry cargo above the main-deck. In our opinion had the cargo been stowed as suggested the probabilities were in favour of her making her voyage. During the course of this inquiry very much has been said on behalf of the owners as to 'Lloyd's' having approved of the construction of this vessel and classed her A 1. 90. 'Lloyd's' thus referred to do not constitute the underwriting body at 'Lloyd's' but are called and known as 'Lloyd's Book Committee,' a different body altogether, and they only certify that such a vessel as the *Constance* is fit to carry dry and perishable cargo to any part of the world, but do not give any opinion as to how much cargo should be carried or where or how stowed.

"The Board of Trade desired the opinion of the Court on the following questions:—

"1. What was the cause of the loss of the steamship *Constance* on the 9th February, 1880?

"2. Whether, taking into consideration the season of year and the nature of the intended voyage, the said steamship was over-n on leaving Cardiff?

"3. Whether the cargo was properly stowed; and

"4. Whether, having regard to the construction of the said steamship, she had sufficient stability for the safe carriage of the cargo on board?

"To which questions the Court replied as follows:—

"1. The cause of the loss of the steamship *Constance* on the 9th February, 1880, was the capsizing and foundering of the said vessel.

"2. The said steamship was overladen when she left Cardiff.

"3. The Court is unable to answer this question, as there is no satisfactory evidence before it as to the stowing of the cargo in the said steamship.

"4. The Court is of opinion that the construction of the said steamship was such that she did not possess sufficient stability for the safe carriage of the cargo on board.

"The judge said, after fully considering all the facts of the case, I do order that the owner or owners of the steamship *Constance* do pay to the Solicitor of the Board of Trade £100 on account of the expenses of this investigation on or before the 31st instant."

We have given this case in full for several reasons:—

First: Because we think that the practice of carrying dead-weight, like coals, above the main-deck, in any quantity, in this class of ship, should be discontinued. The space it occupies certainly ought to be included in the tonnage for dues. As far as we are able to gather the facts, it appears the *Constance* had upwards of 80 tons above the main-deck, and that the top of the space occupied by those coals, if not the top of the coals themselves, would be seven feet above the main-deck.

Secondly: Because there are other steamers similar to the *Constance;* we believe, indeed, that one firm has more than twenty such ships now running, and if those other similar steamers are running with similar cargoes similarly stowed, it is time that the owners, underwriters, masters, officers and crews, as well as the officials of the Board of Trade, should take the report made in this case into their very serious consideration.

Thirdly: Because out of a crew of nineteen hands, twelve, including the master, were drowned.

Fourthly: Because the scale by which this ship was allowed a freeboard of 2 feet 1 inch, that is to say 1½ inch of clear side to every foot depth of hold, is a scale that is not admitted to be sufficient by any recognised competent authority whatever.

Fifthly: Because much was said during the Inquiry (on behalf of the owners) as to Lloyd's having approved of the construction of the vessel, and classed her: and because it illustrates our often-urged contention that "classification" and "safety" are by no means convertible terms—or, in other words, that Mr. Plimsoll's once strongly-urged panacea of compulsory classification of all ships, would not, of necessity or by any means, be the same thing as compulsory safety.

Sixthly: Because these cases, if continued, will inevitably lead the public to believe that legislative interference and State restriction as to a load line will, after all, be necessary.

Seventhly: Because, as the owners relied very much for their justification on the fact that the ship had been classed at Lloyd's, they had no right to ignore the other fact that, by the Tables of Lloyd's Register, her freeboard ought to have been nearly 3 feet, instead of about 2 feet.

ABSTRACTS OF SEA CASUALTIES, 1878-9.

THE Abstracts of Wrecks and Casualties for 1878-9 prepared in the Marine Department of the Board of Trade has recently been published. Our numbers for July last, and for the preceding August and September, contained notices of the Abstracts for the previous two years, in which we set forth as fully as space would permit the main features of those important returns. The return now under notice is the third prepared in the revised form, and presents, in much detail, the wrecks of the twelve months ending with June, 1879, with the totals in each table for the two preceding years. The return is therefore of real statistical value, and its contents are so clearly tabulated that any misapprehension of their purport

by impetuous philanthropists cannot be attributed by them as formerly to the defective or misleading nature of the return.

We have again to note an improvement in the date of the return, which is between one and two months earlier than in last year.

Taken by themselves, the figures in the Wreck Abstracts for 1878-9 are formidable, but considered in relation to the figures for the previous years, and in connection with the rapid growth of the Mercantile Marine, this year has not been remarkably disastrous to shipping. We regret, however, that we have been unable to find in the returns anything to indicate that recent legislation has had the effect of diminishing shipwreck and loss of life at sea.

Progress of British Shipping.

In our notices of previous returns we pointed out that the tonnage of British shipping was rapidly increasing; that this increase was mainly taking place in steamships of a large size; and that the increase was enhanced by the superior power and value of steam tonnage. We also commented upon the decrease in the number of seamen employed, notwithstanding the increase in the tonnage of ships, and also to the increasing proportion of foreign seamen employed in British ships. Our observations have since been confirmed and emphasised by the remarks which have accompanied the last two returns of navigation and shipping, from which we are about to extract some facts and figures.

The number and register tonnage of vessels remaining on the register at the end of the year 1879, were as follows:—

	Sailing Vessels.		Steam Vessels.		Total.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
United Kingdon...	19,945	4,013,187	5,014	2,508,102	24,959	6,521,289
British Possessions	12,717	1,715,908	1,615	225,167	14,332	1,941,075
Total... ...	32,662	5,729,095	6629	2,733,269	39,291	8,462,364

These figures show a decrease of 497 vessels, and 165,602 tons in the sailing-vessels of the United Kingdom, and an increase of 650 vessels, and 57,603 tons in the sailing-vessels of the Colonies as compared with the year 1878. They also show an increase of 202 vessels, and 194,772 tons in the steam-vessels of the United Kingdom and an increase of 320 vessels, and 46,172 tons in the

steam-vessels of the Colonies. The increase in the number and tonnage of colonial shipping is, however, partially accounted for by the addition of 586 vessels, and 86,091 tons on account of vessels on Canadian lakes which were not previously included in the Register.

The greater effectiveness of British tonnage arising from the rapid increase of steam-vessels as compared with sailing-vessels, is vividly shown in the table of entries and clearances. It appears that there was an increase of 2,173,000 tons in the entries, and of 1,652,000 tons in the clearances of British ships, and an increase of 368,000 tons in the entries, and 70,000 tons in the clearances of British sailing-ships at ports in the United Kingdom in one year. On the other hand, there was a decrease of 730,000 tons in the entries, and 834,000 tons in the clearances of foreign steam-ships at ports in the United Kingdom, whilst the increase in the entries and clearances of foreign steam-ships was represented by 173,000 tons and 184,000 tons respectively. The entries of British ships show an increase in tonnage of 8 per cent., and the clearances an increase of nearly 2 per cent. over 1878; whereas the entries of foreign ships show a decline of over 6 per cent., and the clearances of over 7 per cent. as compared with the same year.

The foregoing figures are remarkable in connection with the alleged protracted depression in the shipping trade, but they are still more remarkable in relation to their bearing on the statistics of foreign shipping. It appears that in 1860 the tonnage of the British Empire was 5,710,968 (sailing and steam together), and the tonnage of the principal foreign maritime nations, excluding the river tonnage of the United States, was about 7,000,000 (sailing and steam together). Allowing a steam ton to be equal in effectiveness to about four sailing tons, the tonnage of the British Empire was equal in effectiveness to 7,211,000 tons, whilst the tonnage of foreign countries was equal in effectiveness to 8,000,000.

In 1879, however, the tonnage of the British Empire was about 8,500,000, and the tonnage of the rest of the world was about 8,200,000. Allowing as before for the superior effectiveness of

steam tonnage, it is found that the tonnage of the British Empire is equal in effectiveness to 16,000,000 tons, whilst the tonnage of the rest of the world is equal only to about 11 or 11½ million tons. In 1860 the tonnage of the British Empire represented about 47 per cent. of the tonnage of the world; in 1879 it represented 58 per cent., the tendency apparently being towards a more rapid change in our favour. Notwithstanding the enormous crease in the tonnage and effectiveness of British shipping, it ppears that the number of men and boys employed was less in 879 than in any year since 1863, and positively showed a crease of over 2,000 on the number employed in 1878. Allowing r the influx of foreigners to employment in British ships, and r the rapidly increasing number of stokers, engineers, and others, e cannot but think that the number of really efficient British amen on board some British steamers must be lamentably small. 1864 there were 195,756 men and boys, including 21,923 eigners employed in vessels registered in the United Kingdom, in 1879 there were only 193,548 men and boys employed, of om 24,403 were foreigners. From another return we find that number of men and boys per 100 tons had fallen from 3·97 to 9 in sailing-ships, and from 4·15 to 2·64 per 100 tons in steamps employed in the foreign trade from 1854 to 1876.

At this rate of progress (?) one may live to see a steamship led along like a tram-car by a driver, a helmsman, and perhaps careful services a look-out man, with perhaps a stevedore to plete the stowage of the cargo on the voyage, and an extra n to relieve the others. But seriously, it appears to us that the uction of deck hands employed in cargo steamers has already ched, or perhaps passed the safe limit, and the list recently d out in Court by the Wreck Commissioner of a crew told by an owner to a ship which is since reported as missing, bore close a resemblance to the skeleton crew indicated above. It urious, however, that the proportion of men and boys per 0 tons employed in sailing-vessels in the home trade has eased from 4.97 to 5.19, and this fact should be borne in d in dealing with such vessels. The decrease in the number able seamen employed in foreign-going ships will ultimately

affect the strength of the Naval Reserve, and such a contingency shows how desirable it is to attract the best of our hardy fishing and coast population into the Reserve, whether they have had foreign-going service or not.

Sea Casualties to British Vessels at Home and Abroad.

The number of British vessels affected by sea casualties during the year 1878-79 was 5,964, and the number of casualties in which British vessels were concerned was 6,235. The difference between the number of vessels and the number of casualties is accounted for by some vessels having met with more than one casualty during the year. It appears from the tables that 118 of the vessels which were totally lost had previously met with one or more casualties, and that among the vessels partially damaged there were 464 which had met with more than one casualty, two having met with as many as five and then survived.

These repeated casualties we apprehend are chiefly collisions, and are met with by steam-vessels in the home trade, which are constantly entering ports crowded with navigation.

Only a small proportion of the vessels (5,964) which met with casualties were struck off the Register, 3,320 having met with minor casualties, such as the carrying away of sails, spars, &c., which would not prevent a well found vessel completing her voyage; 1,606 having met with serious casualties, such as would compel vessels to put into port for repairs, or to take assistance &c.; and only 1,038 having been totally lost.

The tonnage of the vessels totally lost was 298,449, or an average per vessel of 287 tons: the tonnage of vessels seriously damaged was 675,437, or an average per vessel of 420 tons, and the tonnage of vessels slightly damaged was 1,269,384, or an average per vessel of 382 tons.

But our concern at present is with the vessels totally lost, and with the lives lost, and we will therefore dismiss these casualties of more or less importance from our notice.

The British vessels wrecked at Home during the year 1878-9, reported during the same year as having been wrecked abroad, e composed as follows :—

	Sailing.		Steam.		Total.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
Belonging to the United Kingdom	551	146,648	95	63,646	646	210,294
Belonging to British Possessions	372	81,569	20	6,586	392	88,155
Totals, 1878-9 ...	923	228,217	115	70,232	1,038	298,249
Against—						
Totals, 1877-8 ...	863	211,841	102	57,193	965	269,034
and						
Totals, 1876-7 ...	1,056	234,395	99	57,095	1,155	291,490

These numbers bear the following percentages to the number and tonnage of vessels *registered* in the United Kingdom and Colonies respectively:—

	Belonging to the United Kingdom.				Belonging to the Colonies.			
	Sailing.		Steam.		Sailing.		Steam.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
1878-9	2·7	3·6	1·9	2·5	2·9	4·7	1·2	2·9
1877-8	2·6	3·5	1·8	2·3	2·7	3.8	1·	2·2
1876-7	3·1	3·9	1·9	2.5	3·5	4·3	1·2	1·7

Altogether, about 2·6 of British vessels in existence and 3.5 of their tonnage were lost during the year 1878-9, against 2·5 of the vessels and 3·23 of their tonnage lost in 1877-8, and 3· of the vessels and 3·58 of their tonnage lost in 1876-7.

The percentage is heavier among sailing than among steam-vessels, but there is a remarkable closeness between the percentages in the various classes from year to year. The percentage of loss amongst steam-vessels registered in the United Kingdom is exactly the same as in 1876, notwithstanding the great alteration in the register during the last two years.

The following percentages will show the size of the vessels lost:—

Percentages of registered British vessels between certain tonnages lost in the years 1878-9, 1877-8 *and* 1876-7.

Years.	Under 50 Tons.	100.	200.	300.	400.	500.	1,000.	1,500.	2,000.	3,000 and upwards.
1878-9	1·3	2·3	4·5	4·9	5·3	4·4	4·9	3·5	3·2	—
1877-8	1·5	2·2	3·5	5·1	4·2	3·8	3·7	3·1	2·	1·7
1876-7	2·	2·7	4·2	6·	5·	4·	3·4	3·7	3·5	·89

It would seem possible by a method of this sort to arrive at results which would prove extremely useful to underwriters. The

average tonnage of British registered vessels in existence is, for sailing-vessels, 175, and for steamers, 412, showing a tendency on the part of sailing-vessels to get smaller, and on the part of steam-vessels to get larger. The average tonnage of British vessels wrecked during the year 1878-9 was, for sailing vessels, 247, against 245 and 221 for the two previous years, and for steamers, 611, against 560 and 576 for the two previous years.

As regards the great increase of small sailing-vessels, it is a circumstance worth recording that the deep-sea fishing vessels are greatly on the increase, and though schooners and brigs that used to be in the coasting trade have been replaced to a very great extent by steamers for the longer voyages, for the shorter voyages sailing-vessels of an improved type of Thames and Medway sailing barges have been introduced. These barges are remarkably handy, and while they are good carriers are swift sailers.

The men who have charge and work them are the very best type of our short voyage seamen.

Causes of Loss.

The following table will show the number and tonnage of British ships lost by various forms of disaster during the year 1878-79, as compared with the averages for the two preceding years:—

	1878-79.			1876-7 and 1877-8.		
	No.	Actual Tonnage.	Average Per Ship.	No.	Tonnage.	Average Tonnage Per Ship.
Founderings ...	202	55,418	274	176	48,328	274
Strandings ...	588	153,668	261	617	152,263	246
Collisions ...	92	21,617	236	79	19,453	246
Other Causes ...	67	27,840	415	61	22,751	373
Missing Vessels	89	39,911	448	125	37,467	300
Totals ...	1,038	298,449	287	1,058	280,262	265

The foregoing table shows that the average tonnage of vessels lost by shipwreck is increasing in something like the same proportion as the average tonnage of vessels on the register. The increase is most noticeable in the class of missing vessels, in which there is a decrease of 36 in the number, and an increase of

2,500 in the tonnage against the average number and tonnage for the two preceding years. It is also noticeable in the "strandings," but this class presents a pretty level record of the disasters arising from stress of weather and other elementary causes, and of those arising from the incompetence and carelessness of man. Omitting collisions and missing vessels, the primary causes of loss may be shown as follows:—

CAUSES CONNECTED WITH

	Weather.	Ships Equipments or Stowage.	Navigation and Seamanship.	Various.	Total.
Founderings ...	146	34	4	18	202
Strandings ...	314	25	186	63	588
Other Losses ...	34	4	1	27	56
Total	494	63	191	108	846

Amongst the various causes of loss, are included 7 vessels lost by spontaneous combustion or explosion of gas, 3 for want of seamarks, 8 from striking floating wreck, 4 from contact with ice, and 2 which were wilfully cast away.

The cargoes of the vessels totally lost, excluding collisions, may be shown as follows:—

	Ballast.	Timber.	Grain.	Coal.	General.	Fishing.	Other Cargoes.	Total.
Founderings	26	18	17	34	11	16	80	202
Strandings	118	46	43	103	72	52	154	588
Other Casualties	15	6	4	7	8	4	23	67
Missing Vessels	3	6	19	20	6	3	32	89
Total	162	76	83	164	97	75	289	946

Coal, grain, and timber cargoes are, as usual, credited with the greatest number of losses of all kinds, but ballast contributes the highest number of strandings, probably owing to the fact that vessels in light ballast trim are often not so manageable as they should be when caught by heavy weather on a lee shore. In dealing with the numerous wrecks of coal, grain, and timber-laden vessels, regard must, however, be had to the magnitude of the trades in which they are engaged. Great as the loss of coal-laden vessels appears to be, it is considerably less than in previous

years, and the reduction is found to have taken place in wrecks other than strandings. The ascertained cases of spontaneous combustion of coal and explosion of coal-gas in 1878-9 numbered 24, including 7 cases of total loss of vessels; in 1877 8 they numbered 29, including 8 cases of total loss; and in 1876-7 they numbered 47, including 13 cases resulting in total loss of vessel. Few will deny that much of this improvement is attributable to the recent action of the Board of Trade, in persistently placing before persons interested in the carriage of coal by sea the peculiar dangers of such cargoes, and in calling attention to the remedies suggested by the Royal Commissioners, who recently investigated the subject, and by the rigorous detention of ill-ventilated ships. No legislation has taken place on the subject. Exhaustive inquiry has been held in each case of explosion or spontaneous combustion, and the result made known by handbills and cautions distributed broadcast, with the satisfactory results indicated in the Wreck Abstracts.

Great improvement has undoubtedly been brought about in the method of ventilating coal cargoes, by the action of the Board of Trade, without any undue hardship to shipowners, colliery owners, or underwriters, and with a distinct advantage to the crews of coal-laden ships. Such, then, would seem to be the legitimate direction which the efforts of the Board of Trade should take, with a view to lessen the dangers of any particular cargo. British Merchant Shipping has grown to its present stupendous proportions without much aid from legislation, and he is a bold man indeed who would rush forward with a law, written perhaps on the crown of his hat in the lobby of the House of Commons, to control the operations of a body of merchants who have secured for England more than a moiety of the commerce of the world. With regard to the losses of coal-laden ships, we may here state that the exports of coal during the year 1879, including the bunker coal of ships employed in the foreign trade, ammounted to nearly twenty-one million tons.

The following facts with reference to the loss of grain-laden ships may be interesting in connection with the current agitation the subject of the stowage of grain.

The total number of British and Colonial grain-laden vessels lost during 1878-9 was, excluding collisions, 83, against 71 and 79 in 1877-8, and 1876-7 respectively.

Taking only the vessels which foundered or were reported as missing in the grain trade during the year, it appears that there were 48 of such losses, against 33 and 48 in 1877-8, and 1876-7 respectively.

These 38 losses were made up of 17 vessels which foundered, and 21 vessels which were missing, including 4 steamers with general or mixed cargoes, of which grain formed a part. Of the 17 vessels which foundered, 6 were registered in the United Kingdom, and 11 were registered in the Colonies. Of the 6 grain-laden vessels belonging to the United Kingdom which foundered, 2 were sailing-vessels, and 4 were steamers, of which 2 were trading between foreign ports. Of the 11 grain-laden vessels belonging to the Colonies which foundered, 4 were bound to the United Kingdom, and 7 were trading between foreign ports.

Of the 21 missing vessels which carried grain, including 4 steamers with mixed cargoes, 14 belonged to the United Kingdom, and 7 belonged to the Colonies.

Of the 14 grain-laden vessels belonging to the United Kingdom which were reported as "missing," 3, of an average of 60 tons, were lost on local voyages; two, including one steamer, with a mixed cargo were trading between foreign ports; and 9, including 4 steamers of which 3 carried mixed cargoes, were bound to the United Kingdom.

Of the 7 grain-laden vessels belonging to the Colonies which were "missing," 5 were bound to the United Kingdom, and 2 were trading between foreign ports.

Altogether 6 British sailing-ships and two steamships foundered in the grain trade with the United Kingdom, and 10 sailing-ships and 4 steamers, of which 3 carried mixed cargoes, were missing in the same trade. The following table will show the number and tonnage of foundered or missing vessels in the oversea grain trade with the number of lives lost:—

	Belonging to United Kingdom.			Belonging to Colonies.			Total.		
	No.	Tonnage.	Lives lost.	No.	Tonnage.	Lives lost.	No.	Tonnage.	Lives lost.
Sailing:—									
Foundered ...	2	749	5	11	6,737	11	13	7,486	16
Missing ...	6	4,642	113	7	5,456	104	13	10,098	217
Steam:—									
Foundered ...	4	3,681	24	—	—	—	4	3,681	24
Missing ...	5	5,498	128	—	—	—	5	5,498	128
Total ...	17	14,570	270	18	12,193	115	35	26,763	385

Deducting from this table the 4 steamers which carried mixed cargoes, we should have a total of 31 British and Colonial vessels, 22,021 tons, and 278 lives lost in the grain trade by causes other than stranding or collision.

The steam-vessels which carried mixed cargoes were the *Zanzibar*, *Homer*, and *Bernina*, bound to the United Kingdom, and the *Surbiton*, bound to a Continental port, all missing with the loss of 107 lives. The other steamers were the *Lindisfarne*, missing with crew of 21 hands on voyage to the United Kingdom, the *Mercury* and *Aberfeldy*, foundered with loss of one life on voyage to the United Kingdom, and the *Yoxford* and *Bayard*, foundered with loss of 23 lives on voyages between foreign ports.

The loss of life and property in grain-laden ships was deplorably heavy. Although not much, if at all, exceeding the proportionate losses in other trades.

The losses of grain-laden ships have been attributed, without discrimination, to the practice of stowage of the grain in bulk, and a Bill was recently brought before Parliament to prevent the importation of grain in any other way than in bags. A powerful appeal to the sympathy of the House of Commons was intensified by a long list of steamers, stated to have been lost during the year 1879 through the stowage of grain in bulk, the facts being that the list in question included all, or nearly all, the steamships lost in two winters in the grain trade, of which some were lost by stranding, collision, and other causes. The grain-laden steamships included in the present Abstracts were included in that list, and we have taken some pains to discover whether, as stated or implied, all these vessels were lost through stowage of their cargoes in bulk.

Taking then the nine steamships which are shown in the Abstract as having foundered or disappeared with whole or part cargo of grain, we find as follows:—

FOUNDERINGS OF GRAIN STEAMSHIPS.

	Tons.	Lives Lost.	
Mercury ...	555	1	Laden with grain in bulk. Disabled by water getting into engine bilges and extinguishing fires. Cargo did not shift.
Aberfeldy ...	861	—	Laden with grain in bulk. Sprang a leak. Fires extinguished. Cargo did not shift.
Yoxford ...	1,301	1	Laden with grain in bulk and bags. Carelessness on part of master, whose certificate was suspended.
Bayard ...	964	22	Laden with grain in bulk and bags. Whilst lying to in gale, fires were allowed to go down, and vessel fell off, and was overwhelmed in trough of sea.
	3,681	24	

The *Yoxford* and *Bayard* were trading between foreign ports.

MISSING GRAIN-LADEN STEAMSHIPS.

	Tons.	Lives Lost.	
Lindisfarne ...	994	21	Laden with oats in bulk and hemp seed in bags.
Zanzibar ...	2,245	28	General (about half grain).
Homer ...	1,916	28	General (less than half cargo of grain).
Bernina ...	1,792	29	General (about half grain).
Surbiton ...	1,373	22	Grain and general (about half cargo of grain in bulk).

The *Surbiton* was trading between foreign ports.

The four steamers laden with general cargoes, including grain, which were missing, all sailed from ports in the United States, where there are regulations for the safe stowage of grain. It is possible that the comparatively small quantity of grain which they carried in bulk may have conduced to their loss, but we are certainly not led to that conclusion by the circumstances of the losses of which we know something, either from the evidence of survivors or from the finding of Courts of Inquiry.

If the loss of life in grain ships could be prevented or mitigated by the use of bags, *and bags only*, then the expenditure of £1,000,000 a

year for bags would be justified, and should be cheerfully paid by the consumer, on whom the cost would of course ultimately fall. But it is not by any means certain that the desired result would ensue from the use of bags. Indeed, it is extremely doubtful, looking to the class of steamer which appears chiefly to have suffered, whether the danger arising from their acknowledged lack of stability would not have been increased rather than lessened by the use of bags. The careless stowage of grain, whether in bulk or bags, may, as in the solitary case of the *Yoxford*, lead to disaster, but it has not been shown that a single vessel laden with bulk-grain has been lost from that cause, provided reasonable care has been devoted to its stowage. It should be remembered that nearly all the grain of the world is carried in bulk, and carried safely as far as the cargo is concerned whenever due care has been exercised. Even cargoes of molasses are carried in bulk.

Undoubtedly the stowage of grain in bulk or bags is susceptible of much improvement, but this improvement may be expected to result from the deliberations and suggestions of practical men, rather than from precipitate and prohibitive legislation advocated by enthusiasts. It is probable that the rapid increase of the grain trade with North America has drawn into that trade many vessels which are scarcely fit to encounter the Atlantic wave in winter, and the present style of long, narrow, deep, water-ballasted steamers is in itself a serious element of danger; but these, as well as the question of stowage, are subjects for inquiry and not for prohibitive legislation.

The Bag Bill is called a temporary measure, and some people therefore look upon it with favour, as affording a safe interval for consideration on the subject; but we recommend such persons to consider whether such a temporary measure is likely to be efficient, and also its certain cost and probable effect on British shipping. It may not be out of place to state here that the quantity of grain imported into the United Kingdom during the year 1879 was 6,234,865 tons, and its value £52,064,496; and it is this important trade, nearly all of which is carried on in British bottoms, that this "temporary" measure, before referred to, is intended to regulate. It should also be remembered that this Bill will not be operative

in respect of the trade between foreign countries, in which, as we have shown, many British vessels were lost.

We shall be glad to hear of the re-appointment of the House of Commons Select Committee to investigate the subject, but pending the result of their deliberations, we strongly deprecate any undue interference with one of the most important branches of maritime commerce.

It used to be the fashion to ascribe the losses of vessels to the villainy of shipowners in sending their vessels to sea in an unseaworthy condition, and the remedy then prescribed was classification. But the cry is now altered, and well it may be, for we find that every one of the nine steamers reported as missing during the year 1878-9, bore a high, if not the highest, class awarded by one or the other of the registries.

The proportion of classed to unclassed vessels is high throughout, although the latter are swelled in number by the fact of small fishing and other vessels being included, of which as a rule the Societies do not take cognizance.

The increase in the number and importance of collisions is not satisfactory. These are disasters which are in the majority of cases directly attributable to the carelessness or neglect of man, and it appears that during the year under notice 1,097 collisions occurred, involving total loss of 92 British vessels of 21,617 tons, serious damage to 309 British vessels of 118,350 tons, and minor damage to 1,114 British vessels of 367,729 tons. This is a great increase on the previous year, in which only 83 vessels were totally lost, 212 vessels sustained serious damage, and 891 vessels sustained minor damage by collision. Including collisions between foreign vessels in British waters, there were 103 collisions involving total loss of one or both vessels, and of these 27 occurred in daylight and 76 at night; of the latter 36 occurred between a steam vessel and a sailing vessel both under way, and 25 between two sailing vessels under way. Only 9 collisions, attended with total loss of one or both vessels, occurred between steamships under way by day or night, at home or abroad. These figures speak well for the care with which steamships are navigated, and seem to denote that much of the risk of collision is caused by sailing

ships. We are satisfied that a great number of collisions are brought about by steamers stopping and reversing, instead of going full speed a-head and keeping the ship under full command of the helm.

In addition to the wrecks and casualties at sea there were reported casualties to 1,240 British, and 80 foreign vessels, in rivers and harbours of the United Kingdom, and 221 British vessels in rivers and harbours abroad, and to 9 foreign vessels in rivers and harbours in British Possessions abroad. As might be expected, the greater number of these casualties were caused by collision, of which only a small number were important, but including amongst them the memorable collision between the *Princess Alice* and the *Bywell Castle*, which occurred in the Thames, above Woolwich.

Loss of Life.

The number of lives lost by sea casualties to British and Colonial ships of every description at home and abroad during the year 1878-9 was 2,064, including 159 passengers. The loss of life in 1878-9 was lower than it had been for many years; but this was owing to the absence from the tables of such great disasters as the loss of the *Eurydice* or *Captain*, which swelled the figures in previous years, and should not in our opinion have appeared in the Wreck Abstract at all.

The year 1878-9 was not, however, without a notable wreck, for the *Princess Alice* was sunk with a loss of about 610 lives; but as the collision occurred in the river above Gravesend, it has not been tabulated with the sea casualties. Thus we find that there is a great reduction in the number of passengers lost at sea, and that there is an immense increase in the number of lives lost in rivers and harbours. We also find that the reduction in the number of lives lost appears to have taken place in wrecks upon our coasts, but in reality if the lives lost in rivers and harbours were added to the lives lost on the coasts, the total would be higher than the total for several years past.

We must, however, for the sake of consistency, exclude from our observations, as in previous years, the lives lost in rivers and

harbours at home, amounting to 617, against 13 and 15 in the two previous years, and the lives lost in rivers and harbours abroad, amounting to 11, against 18 and 2 in the two previous years.

Taking, therefore, sea casualties on the coast, and within an arbitrary line enclosing the British Isles at a distance of 10 miles from the most prominent headlands, we find the loss of life to have been as follows :—

LIVES LOST ON THE COASTS OF THE UNITED KINGDOM.

	Sailing. Vessels.	Sailing. Lives Lost.	Steam. Vessels.	Steam. Lives Lost.	Total. Vessels.	Total. Lives Lost.
Belonging to United Kingdom ...	85	298	11	53	96	351
Colonies	4	12	—	—	4	12
Foreign Countries	16	67	2	60	18	127
Total, 1878-9 ...	105	377	13	113	118	490
Totals for 1877-8	111	802	15	90	126	892
„ „ 1876-7	117	680	15	96	192	776

Of the 490 lives lost on the coasts of the United Kingdom, 45 were lost in 13 vessels that foundered, 146 were lost in 34 vessels that stranded, 145 were lost from 29 vessels in collision, 100 were lost in 19 vessels which were missing on voyages between ports in the United Kingdom, and 54 were lost from 23 vessels which met with various casualties not included in the foregoing classes. The number of lives lost in foreign vessels was swelled by the sinking of the German steamer *Pommerania*, with 17 of her crew and 38 passengers, after collision with the British barque *Moel Lilian*.

LOSS OF LIFE ABROAD.

The number of lives lost in British vessels abroad was 1,701, and in foreign vessels on the coasts of British possessions abroad 31, making a total of 1,732. Of these 1,732 lives only 189 were lost on the coasts of British possessions abroad, 214 were lost on the coasts of foreign countries, and 1,329 were lost at sea.

In 32 vessels that foundered 154 lives were lost; in 54 vessels

that stranded 324 lives were lost; 139 lives were lost from 16 vessels which were in collision; 999 lives were lost in 70 missing vessels; and 116 lives were lost from 76 vessels which met with casualties not described. The following table shows the loss of life elsewhere than on the coasts of the United Kingdom:—

	Sailing.		Steam.		Total.	
	Vessels.	Lives lost.	Vessels.	Lives lost.	Vessels.	Lives lost.
Belonging to United Kingdom ...	97	688	44	404	141	1,092
Colonies	98	599	4	10	102	609
Foreign Countries ...	5	31	—	—	5	31
Totals for 1878-9 ...	200	1,318	48	414	248	1,732
„ „ 1877-8 ...	156	1,047	44	610	200	1,657
„ „ 1876-7 ...	279	2,101	41	598	320	2,699

Lives lost in British Vessels at Home and Abroad.

The following table shows the number of casualties attended with loss of life and the number of lives lost, during the year 1878-9. It includes losses of British and Colonial vessels, whether registered or unregistered, steam or sailing, fishing, yachting, or trading all over the world:—

		Coasting.	Oversea.	Fishing.	Total.
Founderings ...	Vessels	10	31	2	43
	Lives Lost	40	140	8	188
Strandings ...	Vessels	21	50	3	74
	Lives Lost	70	305	33	408
Collisions ...	Vessels	19	13	8	40
	Lives Lost	84	116	13	213
Other Causes ...	Vessels	8	84	5	97
	Lives Lost	11	134	11	156
Missing Vessels...	Vessels	18	68	3	89
	Lives Lost	91	977	31	1,099
Totals ...	Vessels	76	246	21	343
	Lives Lost	296	1,672	96	2,064

These figures may be shown again as follows:—

		Coasting.	Oversea.	Fishing.	Total.
Belonging to United Kingdom ...	Vessels	64	154	19	237
	Lives lost	232	1,142	69	1,443
Colonies	Vessels	12	92	2	106
	Lives lost	64	530	27	621
Totals	Vessels	76	246	21	343
	Lives lost	296	1,672	96	2,064

The Wreck Abstract is a remarkable record of disasters, many of which are attributable to the carelessness of man, and some undoubtedly to causes over which man has at present little or no control. The record is not so black as it was in some previous years, but it is dark enough to remind us that "ships are but boards."

THE NEW NAVIGATION AND SUMNER'S METHOD.

We have received from several correspondents and subscribers brief congratulations on our having undertaken to introduce to their notice, as occasion offers, the *new system of navigation* so much spoken of and praised by our continental neighbours. Our readers may take it for granted that we shall always do our best for them, and keep them well posted on everything that tends to improve the methods of navigation, and the "art of sailing on the sea."

One correspondent, Mr. E. H. Hebden, Jun., formerly a frequent contributor to our pages on various subjects, especially on Lunars, &c., writes, "many thanks to you for having introduced into the March number of the *Nautical Magazine* of this year, a 'New Navigation' method of finding latitude and longitude of the ship by the double altitude of sun or stars. I hope you will also introduce any other new methods in future for the good of British seamen." And he concludes by requesting us to give the list of foreign works bearing on the subject; these we append, as many of our readers may wish to be similarly informed.

Another correspondent, Mr. F. R. Mackenzie, also favours us with the following useful observations on the same subject:—

"You published a capital paper in your Magazine for February, on the 'New Navigation.' I came across it accidentally a few days ago, and being a bit of an amateur navigator, read it with much interest. I have no doubt whatever that there is a great future before what might be called 'Intersectional Navigation.' It struck me, however, that there was a way of shortening the

figure work, which I fear most practical seamen regard as a 'weariness to the flesh,' by using a very useful problem, and finding the hour-angle and the azimuth of the celestial object by one operation. You can then project a line of position, without the trouble of working two hour-angles, with two assumed latitudes, using latitude by D.R., or the most accurate latitude you are able to obtain.

"It is clear also that there is no need to work out results on a chart. Half a sheet of note paper, or the blank side of the pages of the log book answer perfectly for any 'intersectional' problem, and Gunter's scale and a pair of compasses are all the instruments required; though a 8 in. horn protractor, with points on an inner circle and degrees at the edge, would be useful, and it would not be difficult to adapt a vernier piece by which angles could be laid down to ten mins. of arc. If it were made semicircular, and a scale of $\frac{1}{20}$th of an inch were made on the diameter, it would be an exceedingly useful instrument for the navigator of the future. What I would propose for projection is to make $\frac{1}{20}$th inch = one nautical mile. Three inches would then represent one degree of long. for a Mercator's projection, the length of whatever degree of lat. being taken from the table of meridional parts. Thus from 50° to 51° you would want 92 miles to give the Mercator proportion. I have worked out your February problem, and projected it in the way I suggest, and it works out within half-a-mile of what you give as the correct answer."

Both the above gentlemen furnish neat solutions of the problem given on page 216, of the March number of the *Nautical Magazine*. We call the attention of our readers to the fact that the "New Navigation" runs through the January, February, and March numbers; and may be further continued at an early date. The method of finding time and azimuth, or altitude and azimuth, in a few figures is no new problem; but the application of either problem, by a method of "intersection," for finding a ship's position at sea, is of comparatively recent date. But the azimuth needs no computation now that we have the Time-azimuth Tables of Burdwood, ...s, and Labrosse; and the entire problem may very generally

be prepared for projection with considerable accuracy, using only the latitude by dead reckoning. But our space does not at present admit of our showing this, and many other useful applications of the "New Navigation."

The principal works connected with these problems are published in France; they are as follows:—

Cours de Navigation, par Louis Pagel, capitaine de frégate. (Challamel ainé.)

Memoire sur le Point Observè et la Détermination des Courants à la Surface des Mers, par A. Fasci, professeur d'hydrographie. (Arthus Bertrand.)

La Navigation Hauturière par la Droite de Hauteur des Astres, par A. Fasci. (Bertrand.)

Etude sur les Courbes de Hauteur, par G. Hilleret, lieutenant de vaisseau. (Bertrand.)

Note sur la Détermination du Point, par A. Marcq-Saint-Hillaire, capitaine de frégate.

Tables Destinées à Abréger les Calculs Nautiques, par E. Perrin. (Bertrand.)

Nouvelle Navigation Astronomique: theorie par M. Yvon Villarceau, Astronome de l'observatoire de Paris; pratique par M. Aved de Magnac, lieutenant de vaisseau. (Gauthier-Villars.)

Notes on the various methods appear, from time to time, in the *Revue Maritime* and in the *Annales Hydrographiques*; the Dutch and Germans have also introduced the methods into their navigation, and modified some of the formulæ.

SEAMEN'S WAGES.

THE extremely laudable and very successful efforts now being made by the Board of Trade to prevent seamen, on their arrival at British ports, from falling into the hands of land sharks, are, we rejoice to say, attracting considerable attention in the nautical world at home and abroad. To get to windward of the crimps,

to render the seaman independent of them and of his shipowner, to enable him to proceed at once to his home when reaching a strange port after a long voyage, and to encourage reckless Jack to adopt habits of prudence and providence, are such enormous advantages to the Mercantile Marine of our country, that we urge upon all shipowners, masters, engineers, officers and seamen to give their hearty support to this movement, and to use every opportunity of making public the arrangements notified in the following announcements issued from the Board of Trade :—

"NOTICE TO OWNERS AND MASTERS.

"TRANSMISSION OF WAGES.

"The Board of Trade invite the assistance of Shipowners and Masters in the steps they are taking in co-operation with certain of the Local Marine Boards to arrange for the payment of Seamen's wages at their Ports of residence, so as to enable Seamen to proceed straight to their homes as soon as the vessel is secured in dock and their services are dispensed with, instead of being detained at the Port of Discharge until they are paid off.

"The necessary Forms will be placed on board each Long-Voyage Ship on her arrival at her Port of Discharge, and the Board will be glad if the Master will cause the Notices to be distributed amongst the crew. For those men who wish to avail themselves of this arrangement, the Master is requested to be good enough to have the particulars of deductions, &c., made up and entered on Form Dis. 3^a, to sign the same, and to hand it to the Board of Trade Officer who will board the vessel on her arrival to render any assistance needed by the Master or Seamen, and to collect the men.

"This arrangement at present only applies to the Ports of London, Liverpool, Cardiff, Bristol, Dundee, Plymouth, Leith, Shields, and Swansea.

"By Order of the Board,

"THOMAS GRAY, *Assistant-Secretary.*

"Board of Trade, Marine Department,

"*March*, 1880."

"NOTICE TO SEAMEN.

"*For distribution amongst the Crew upon the Ship's arrival in Port.*

"ARRANGEMENTS FOR ENABLING SEAMEN ON ARRIVAL AT THE PORT TO PROCEED TO THEIR HOMES AT ANY CUSTOMS PORT.

"Any Seaman having a balance of at least £3 to receive, and living at or near any Customs Port (hereinafter referred to as his 'Home Port',) if desirous of proceeding there immediately after his discharge without waiting for the payment of his wages, will be enabled to do so, as soon as the vessel is safely moored in dock, or his services are no longer required, and have his balance of wages sent on to him, under the following arrangements :—

"The Seaman must inform the Master of his wish to go straight to his 'Home Port.' The Master will then have to enter the amount of the deductions to be charged against his wages in a Form which will have been sent to him for the purpose.

"This Form will have to be given up to the Board of Trade officer, who will board the ship upon her entry into the Dock, and upon receiving it the officer will collect the men who are going home and take them to the Mercantile Marine Office, where they will have to sign a Form (Dis. 3*b*.), which contains spaces in which the Seaman must certify that the deductions to be charged to his account are correct, and must agree to submit to the award of the Superintendent of the Mercantile Marine Office on any question arising out of his account and settlement, and must further sign an authority for the remittance of his wages to the Mercantile Marine Office of his 'Home' Port. He will receive a railway or steamboat ticket-warrant (to be exchanged at the booking office for a ticket); and, if required, a small sum for subsistence expenses, which, together with the amount of fare, will be deducted from his balance of wages. He will also be furnished with an authority (Dis. 4) for receiving his balance of wages at his 'Home' Port. This authority must be kept carefully by the Seaman, and presented to the Superintendent at the 'Home' Port, as difficulty may occur in getting the balance if it is lost or defaced.

"If the Seaman should by any chance miss the officer, he should proceed with as much speed as possible to the Mercantile Marine Office.

"By Order of the Board,

"THOMAS GRAY, *Assistant-Secretary*.

"Marine Department, Board of Trade,

"*March*, 1880."

SAVE YOUR WAGES.

"When you come back to port after a long voyage and have to receive wages amounting to three pounds or more, it is a pity, and it is your own fault, if you and your wife, children, mother, or sister, or whoever may be keeping your home together, do not have the use of the money.

"If you stop in a strange port, you may get into debt, lose your well-earned money, get disease into the bargain, and you will have to rely on an advance note before you can go to sea again.

"If you make haste to your own home, and have your money sent after you, you will not have to get into debt in a strange place, you will not lose your money, and you will save your health. But more than all this, you, and those you desire to help, will be gainers with you, and you will save your clothes and not need an advance note next voyage.

"Therefore, when you arrive in port at the end of this voyage, ask the Board of Trade officer, as soon as he boards your ship, to arrange for your passage home to your family at once, and to send your wages after you. He will give you a paper to fill up, a railway warrant for yourself, some cash for the journey, and will see you off.

"Do not hesitate but go at once, have your money home, save your clothes, save your health; spend your money amongst the friends of your home; help those at home who are anxiously expecting you.

"THOMAS GRAY.

"Board of Trade,

"*March*, 1880.

"*Ports and places from which you will be able to get passes straight home, to any other port, or to any part of the country:—*

"London, Gravesend, Shields, Swansea, Cardiff, Plymouth, Leith, Dundee, Liverpool; *and shortly from* Bristol, *and* Glasgow, *and* Greenock, *and many others. Therefore, when you come back, be sure to ask of the first Board of Trade officer you see on board your ship.*

"*Over* £50,000 *have already been sent home this way in a very short time.*"

"INSTRUCTIONS TO SUPERINTENDENTS.

"TRANSMISSION OF WAGES.

"Arrangements have been made at certain Ports, viz., London, Liverpool, Cardiff, Bristol, Dundee, Plymouth, Leith, Shields, and Swansea (to which list other Ports will from time to time be added), hereinafter referred to as 'Arrival Ports,' under which Seamen, upon leaving their ships, can proceed at once to the Ports where they live, or to which they wish to go, *i.e.*, any Customs Port in the United Kingdom, hereinafter referred to as 'Home Ports,' without having to wait for the payment of their wages, thus avoiding in a great measure the risk of falling into the hands of crimps and low characters.

"These arrangements are as follows:—

"A Form (Dis. 3a) has been prepared on which the Master of the vessel will enter the amount of deductions to be charged against the wages of each man who desires to proceed at once to his 'Home Port.'

"Copies of these Forms (Dis. 3a) and of Printed Notices, which have been prepared addressed to Master and Seamen respectively, should be sent to the Masters of vessels in long voyage trades upon their entering Port. For this purpose the assistance of the Pilots and Customs Officers should be invoked in order that the Forms may be delivered at the earliest opportunity, so that they may be filled up before the ship enters Port. To prevent disappointment, however, further copies should be taken on board by the Board of Trade officer at the earliest moment possible.

"It will be the duty of this officer at the same time to ascertain

whether any Seamen desire to proceed straight to their 'Home Ports.' In every case where a Seaman desires to do so the officer must satisfy himself—

"1. That the Seaman has a balance after deductions of all kinds, including allotment-payments (if any are referred to in the Agreement) of at least £3 to receive.

"2. That the Master has signed the Form (Dis. 3ª).

"3. That the dates of engagement and rates of wages and particulars of allotment have been entered in the Form (Dis. 3ª).

"The officer will then collect these Seamen and the Form (Dis. 3ª) and proceed with the men and their luggage to the Mercantile Marine Office.

"On their arrival each man will have to make a formal application on (Dis. 3*b*.) that his wages may be forwarded to him at the 'Home Port,' to which he intends to proceed, to certify that the deductions which are to be charged to his account are correct, and to agree to submit to the award of the Superintendent on any question arising out of the account and settlement, and in the matter of allotments charged against his balance.

"The Superintendent will then, after satisfying himself that the man has a sufficient amount due to cover the various outgoings and leave a balance, deliver to him an authority (Dis. 4) to apply to the Superintendent of the Mercantile Marine Office at the 'Home Port' mentioned thereon for payment of the balance due to him (which authority the Seaman will present to the Superintendent of that Port when he applies for payment). The Superintendent will at the same time advance to each man requiring it a sum not exceeding 10s., or in very exceptional cases £1, for his personal expenses, and furnish him with a Warrant (Dis. 6) which will be exchanged for a railway ticket at the station of the line by which the Seaman will travel, or if the man wishes to proceed by steamer, with a warrant (Dis. 6ª) which will be exchanged for a steamboat ticket.

"The sum advanced is to be charged in Schedule 44.

"All cab and cartage fares must be borne by the Seamen themselves.

"The Superintendent should be careful to see that the Dis. 3^b and Dis. 4 bear the same rotation number.

"The Master of the vessel on paying off his crew will deliver to the Superintendent the Seamen's account of wages, together with vouchers showing what amount of allotment money, if any, has actually been paid under any allotment note. The Superintendent, if satisfied as to their correctness, will receive from the Master the balance of wages, and give him an acknowledgment (Dis. 5) for the amount. The Superintendent will then deduct the sum advanced to the Seaman and the railway or steamboat fare, and forward to the Superintendent at the 'Home Port' where the Seaman is to be paid, an authority (Dis. 7) for payment of the balance due. The Dis. 7 should bear the same number as the Dis. 3^b and Dis. 4. He will forward at the same time the application (Dis. 3^b), together with the certificate of discharge and character duly prepared for delivery to the Seaman.

"All receipts are to be credited in Schedule 49 in the appropriate columns.

"The Superintendent at their 'Home Port' will pay the Seaman upon presentation of the (Dis. 4) before referred to, and will return to the Superintendent at the 'Arrival Port' the Form Dis. 3^b, containing the Seaman's receipt releasing the ship from all further claims, which receipt will be placed with the ship's articles to be forwarded to the office of the Registrar-General of Seamen.

"All Payments are to be charged in Schedule 44, to which forms Dis. 4 and 7 are to be attached as vouchers.

"The Superintendents at the 'Home Ports,' in carrying out the above arrangements, are in no case to make any payment unless and until they have received a notification (Dis. 7) from the Superintendent at the 'Arrival Port' that the amount has been received by him. They should also first question the Seamen from the Forms Dis. 3^b and 7, to satisfy themselves as to identity.

"The following are the Forms to be used in the transaction :—

"Dis. 3^a, on which the Master will enter the names of the men who wish to proceed straight to their 'Home Ports,' and the gross deductions to be charged against each man's wages.

"Dis. 3^b, on which the Seaman will make a formal application to have his wages forwarded, will certify to the deductions to be charged against his wages; will agree to submit to the award of the Superintendent, and to bear the cost of the advance and the railway fare; and on which the Seaman will eventually, on receiving his balance of wages, sign a release.

"Dis. 4, on which the Superintendent at the 'Arrival Port' will give the Seaman an authority to apply for his wages to the Superintendent at the 'Home Port' to which he is about to proceed.

"Dis 5, on which the Superintendent at the 'Arrival Port' will give an acknowledgment to the Master of the vessel when the latter delivers to him the amount due to the Seaman.

"Dis. 6, Warrant for railway ticket, which will be given to the Seaman, and which will be exchanged at the railway terminus for a ticket.

"Dis. 6^a, Warrant for a steamboat ticket.

"Dis. 7, authority for Superintendent at 'Home Port' to pay the Seaman the balance due.

"Whenever a Crew is engaged at the Mercantile Marine Office for a long voyage ship, a copy of the 'Notice to owners and Masters' on this subject, and of the form (Dis. 3^a), should be inserted in the official Log Book supplied to the ship. Copies of the handbill 'Save your Wages' should at the same time be distributed amongst the Crew, and the Master should be asked to have copies of it posted up in the Crew's quarters on board.

"T. H. Farrer, *Secretary*.

"Thomas Gray, *Assistant-Secretary*."

THAMES NAVIGATION.

[The following are the new Bye-laws and Rules recently settled by the Thames Conservancy Board, and which come into force on and after the 1st instant.]

"At the Court at Windsor, the 18th day of March, 1880.

"PRESENT:

"*The Queen's Most Excellent Majesty in Council.*

"WHEREAS by 'The Thames Conservancy Act, 1857,' it is enacted that the Conservators of the River Thames shall have power and authority from time to time to make bye-laws for the regulation, management, and improvement of the River Thames and the navigation thereof, in the manner thereby provided, and to impose penalties not exceeding five pounds for the breach or non-performance of such bye-laws:

"And whereas by the forty-seventh section of the said Act it is enacted that no such bye-laws shall be in force until the same have been sent to the Lord Chief Justice of the Court of Queen's Bench, the Lord Chief Justice of the Court of Common Pleas, and the Lord Chief Baron of the Court of Exchequer, and shall have been approved by one of them:

"And whereas by the thirty-first section of 'The Thames Conservancy Act, 1864,' it is enacted that from and after the thirty-first day of December, one thousand eight hundred and sixty-four, section forty-seven of 'The Thames Conservancy Act, 1857,' shall be repealed, and that bye-laws made after the commencement of such repeal under the authority of either of the said recited Acts shall not have any force unless and until they are allowed by Order of Her Majesty in Council:

"And whereas by the forty-first section of 'The Thames Navigation Act, 1866,' it is enacted that, from the passing of the said Act, the Conservators of the River Thames shall have the same or the like powers and authorities over and with respect to the Thames and Isis from Staines to Cricklade, as they have by virtue of the Thames Conservancy Acts, 1857 and 1864, over and with respect to the Thames below Staines:

"And whereas by the forty-second section of the same Act it is enacted, that the provisions of the said Conservancy Acts of 1857 and 1864 respecting bye-laws shall extend and apply to bye-laws for the purposes of the Upper Navigation Acts, or the said 'Thames Navigation Act, 1866:'

"And whereas by the twelfth section of 'The Thames Conservancy Act, 1867,' and by the eighth, ninth, and thirty-fifth sections of 'The Thames Navigation Act, 1870,' further powers were vested in the Conservators respecting the making of bye-laws:

"And whereas the said Conservators have, in exercise of the powers conferred upon them by the said recited Acts, made and submitted for the allowance of Her Majesty in Council certain rules and bye-laws for the regulation, management, and improvement of the navigation of the River Thames, and amongst others certain bye-laws which have been allowed by Orders in Council dated respectively the fifth day of February, one thousand eight hundred and seventy-two, the twentieth day of November, one thousand eight hundred and seventy-three, the seventeenth day of March, one thousand eight hundred and seventy-five, and the eleventh day of July, one thousand eight hundred and seventy-seven:

"And whereas it has been deemed expedient by the said Conservators to repeal in part the said last-mentioned bye-laws, and to make new bye-laws in lieu of the portions so repealed, in the manner set forth in the schedule hereunto annexed:

"And whereas the said new bye-laws have been duly published in accordance with the said recited Acts; and it has been made to appear to Her Majesty that the said new bye-laws are reasonable and proper.

"Now, therefore, Her Majesty by virtue of the powers vested in Her by 'The Thames Conservancy Act, 1864,' and of every other power enabling Her in that behalf, by and with the advice of Her Privy Council, is pleased to allow the said new bye-laws, and to direct that the same shall come into force from and after the first day of June, one thousand eight hundred and eighty.

"C. L. PEEL."

"Schedule referred to in the above Order.

"Bye-laws numbered 28, 29, with sub-sections *(a) (b) (c) (d) (e) (f) (g) (h) (i) (j)*, and 32 with sub-sections *(a) (b) (c) (d)*, 33, 34, 35 with sub-sections *(a)* and *(b)*, and 46 allowed by Order of Her Majesty in Council on the 5th February, 1872, and the bye-law so allowed on the 20th November, 1873, and bye-laws numbered 1, 4, 5, so allowed on the 17th March, 1875, and bye-law No. 5 so allowed on the 11th July, 1877, shall after these present bye-laws have been allowed by Order of Her Majesty in Council be, and the same are hereby, repealed.

"*Interpretation.*—The word 'Vessel' shall mean any ship, lighter, barge, boat, wherry, punt, canoe, and any kind of craft whatever, whether navigated by steam or otherwise.

"The word 'River' shall mean that part of the River Thames which is within the jurisdiction of the Conservators between Cricklade, in the County of Wilts, and Yantlet Creek, in the County of Kent.

"1. In obeying and construing the following rules due regard shall be had to all dangers of navigation; and to any special circumstances which may render a departure from the rules necessary in order to avoid immediate danger.

"2. *Not to neglect proper precautions.*—Nothing in the following rules shall exonerate any vessel, or the owner, or master, or crew thereof, from the consequences of any neglect to carry lights, or signals, or of any neglect to keep a proper look-out, or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

"Bye-Law for the Regulation of the Navigation of the River.

"3. *Steam-vessels to be navigated with care as to speed.*—Every steam-vessel navigating the river shall be navigated with care and caution, and at a speed and in a manner which shall not endanger the safety of other vessels or moorings, or cause damage thereto, or to the banks of the river. Special care and caution shall be used in navigating such steam-vessel when passing vessels

employed in dredging or removing sunken vessels or other obstructions.

"If the safety of any vessel or moorings is endangered or damage is caused thereto or to the banks of the river by a passing steam-vessel, the onus shall lie upon the owner of such steam-vessel to show that she was navigated with care and caution, at such speed and in such manner as directed by this Rule.

"BYE-LAWS AND RULES FOR THE REGULATION OF THE NAVIGATION OF THE RIVER BETWEEN YANTLET CREEK AND TEDDINGTON LOCK.

"*Rules concerning Lights.*

"4. The lights mentioned in the following Rules, numbered 5 to 10 and no others, shall be carried in all weathers, from sunset to sunrise.

"5. *Steamers' lights.*—A steam-vessel when under way shall carry:

"(*a.*) On or before the foremast, or if there be no foremast, on a staff at the forepart of the vessel at a height above the hull of not less than 20 feet, and if the breadth of the vessel exceeds 20 feet, then at a height above the hull not less than such breadth, a bright white light, so constructed as to show a uniform and unbroken light over an arc of the horizon of 20 points of the compass; so fixed as to throw the light 10 points on each side of the vessel, viz., from right a-head to 2 points abaft the beam on either side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles. Provided that steam-vessels which navigate both above and below London Bridge shall not be required to carry their lights at a greater height than 12 feet above the hull.

"*Above London Bridge.*—Steam-vessels navigating only above London Bridge, may carry the white light at any convenient height above the stem.

"(*b.*) On the starboard-side, a green light, so constructed as to show a uniform and unbroken light over an arc of the horizon of [illegible] points of the compass; so fixed as to throw the light from right [illegible]d to two points abaft the beam on the starboard-side, and of

such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least one mile.

"(*c.*) On the port-side, a red light, so constructed as to show a uniform and unbroken light over an arc of the horizon of 10 points of the compass; so fixed as to throw the light from right a-head to two points abaft the beam on the port-side, and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least one mile.

"(*d.*) The said green and red side-lights shall be fitted in such a manner as to prevent these lights from being seen across the bow.

"(*e.*) *Steamers when towing to have two white lights.*—A steam-vessel, when towing another vessel, shall, in addition to her side-lights, carry two bright white lights in a vertical line one over the other, not less than four feet apart. Each of these lights shall be of the same construction and character, and shall be carried in the same position as the white light which other steam-vessels are required to carry.

"(*f.*) *Stern light when towing.*—A steam-vessel towing may also carry a light showing a-stern as a guiding light to the vessel or vessels towed, but this light must be so screened as not to be visible further forward than four points abaft her beam.

"6. *Sailing-vessels' lights.*—A sailing-vessel under way, or being towed, shall only carry the side-lights provided by (*b*) and (*c*) of Rule 5 for a steam-vessel under way.

"7. *Anchor lights.—Outer vessels in tiers.*—A steam-vessel, a sailing-vessel, or a barge, when at anchor in the river, shall carry where it can best be seen, at a height not exceeding 20 feet above the hull, a white light, in a globular lantern of not less than eight inches in diameter, and so constructed as to show a clear, uniform, and unbroken light, visible all round the horizon, at a distance of at least one mile; provided always that where masted vessels are lying in tiers, the outermost off shore masted vessels of each tier shall each carry a light similar to that required for vessels at anchor, but barges lying at the usual barge moorings in the river above Barking Creek shall not be required to exhibit such riding light.

"8. *Overtaken vessels.*—A vessel which is being overtaken by another vessel below Barking Creek shall show from her stern to such last-mentioned vessel, a white light, or a flare-up light.

"This Rule shall not apply to boats, wherries, punts, or canoes.

"9. *Lights to mark position of wrecks.*—All vessels, when employed to mark the positions of wrecks or other obstructions, shall exhibit two bright lights, placed horizontally, not less than six nor more than twelve feet apart.

"10. *Dredgers' lights.*—Every steam-dredger moored in the river shall, between sunset and sunrise, exhibit three bright lights from globular lanterns of not less than eight inches in diameter, the said three lights to be placed in a triangular form, and to be of sufficient power to be distinctly visible with a clear atmosphere, on a dark night, at a distance of at least one mile, and to be placed not less than 6 feet apart on the highest part of the framework, athwart-ships.

"*Rules concerning Fog, &c., Signals.*

"11. *Caution as to speed in a fog.*—All vessels entering or being overtaken by a fog shall be navigated with the greatest caution and at a very moderate speed.

"12. *Steam-whistles and bell.*—Every steam-vessel navigating the river shall be provided with a steam-whistle or other efficient steam sound signal, so placed that the sound may not be intercepted by any obstruction, and also with an efficient bell.

"*Fog-horn and bell.*—Every sailing-vessel navigating the river shall be provided with an efficient fog-horn, and also with an efficient bell.

"13. In fog, whether by day or night, the signals described in this rule shall be used, that is to say:

"(*a.*) *Fog-signals when under way.*—A steam-vessel under way shall make with her steam-whistle, or other steam sound signal, at intervals of not more than two minutes, a prolonged blast.

"(*b.*) A sailing-vessel under way shall sound her fog-horn at intervals of not more than two minutes.

"(*c.*) All steam-vessels, and all sailing-vessels, when in the fairway of the river, and not under way, shall, at intervals of not more than two minutes, ring the bell.

"*Rules as to Speed and Mode of Navigation.*

"14. *Slacken speed or stop.*—Every steam-vessel, when approaching another vessel, so as to involve risk of collision, shall slacken her speed, and shall stop and reverse if necessary.

"15. *Speed between Barking Creek and London Bridge.*—Steam-vessels navigating the River between Barking Creek and London Bridge, other than river passenger steamers certified to carry passengers in smooth water only, shall never exceed a speed of seven statute miles per hour over the ground whether with or against the tide.

"16. *Overtaking vessel to keep out of the way.*—Every sailing-vessel or steam-vessel, overtaking any other vessel, shall keep out of the way of the overtaken vessel, which latter vessel shall keep her course.

"BYE-LAWS AND RULES REGULATING THE NAVIGATION OF THE RIVER BETWEEN YANTLET CREEK AND A LINE DRAWN FROM BLACKWALL POINT TO BOW CREEK.

"*Steam-whistle Signals.*

"17. When two steam-vessels are in sight of one another and are approaching with risk of collision, the following steam-signals shall be intimations of the course they intend to take:

"(*a*) *When intending to pass port-side to port-side.*—One short blast of the steam-whistle, of about three seconds duration, to mean, 'I am directing my course to starboard, and intend to pass you port-side to port-side.' The use of this signal shall be optional.

"(*b*) *When intending to pass starboard-side to starboard-side.*—Two short blasts of the steam-whistle, each of about three seconds duration, to mean, 'I am directing my course to port, and intend to pass you starboard-side to starboard-side.'

"This latter signal shall not be used in the case provided by Rule (22) where that Rule can be obeyed; but it shall be compulsory to use this signal when a departure from that Rule is necessary to avoid immediate danger.

"18. *When a steam-vessel cannot keep out of the way of a sailing-vessel.*—When it is unsafe or impracticable for a steam-vessel to

keep out of the way of a sailing-vessel, she shall signify the same to the sailing-vessel by four or more blasts of the steam-whistle in rapid succession, the blast to be of about two seconds duration.

"19. *Prolonged blast of not less than five seconds duration.*—The signals by whistle mentioned in the preceding Rules shall not be used on any occasion or for any purpose except those mentioned in the Rules; and no other signal by whistle shall be made by any steam-vessel unless it be by a prolonged blast of not less than five seconds duration.

"*Steering and Sailing Rules.*

"20. When two sailing-vessels are approaching one another, so as to involve risk of collision, one of them shall keep out of the way of the other, as follows, viz.:—

"(*a.*) A vessel which is running free shall keep out of the way of a vessel which is close-hauled.

"(*b.*) A vessel which is close-hauled on the port-tack shall keep out of the way of a vessel which is close-hauled on the starboard-tack.

"(*c.*) When both are running free with the wind on different sides, the vessel which has the wind on the port-side shall keep out of the way of the other.

"(*d.*) When both are running free with the wind on the same side, the vessel which is to windward shall keep out of the way of the vessel which is to leeward.

(*e.*) A vessel which has the wind aft shall keep out of the way of the other vessel.

"21. *Steam-vessels to keep out of the way of sailing-vessels.*—If a sailing-vessel and a steam-vessel are proceeding in such a direction as to involve risk of collision, the steam-vessel shall keep out of the way of the sailing-vessel.

"*If steam-vessel cannot keep out of the way. See Rule* 18.—If, owing to causes beyond the control of those navigating the steam-vessel, it is unsafe or impracticable for the steam-vessel to keep out of the way of the sailing-vessel, she shall signify the same to the sailing-vessel by four or more blasts of the steam-whistle in rapid succession, as mentioned in Rule 18; the sailing-vessel shall then keep out of the way.

"22. *Two steam-vessels approaching to pass port-side to port-side.*—When two steam-vessels proceeding in opposite directions, the one up and the other down the river, are approaching one another so as to involve risk of collision, they shall pass one another port-side to port-side.

"23. *Rounding points.*—Steam-vessels navigating against the tide shall, before rounding the following points, viz., Coalhouse Point, Tilburyness, Broadness, Stoneness, Crayfordness, Cold Harbour Point, Jenningtree Point, Halfway House Point or Crossness, Margaretness or Tripcock Point, Bull Point or Gallionsness, Hookness, and Blackwall Point, ease their engines, and wait until any other vessels rounding the point with the tide have passed clear.

"24. *Steam-vessels crossing the river.*—Steam-vessels crossing from one side of the river towards the other side, shall keep out of the way of vessels navigating up and down the river.

"25. Where by the above Rules one of two vessels is to keep out of the way, the other shall keep her course.

"BYE-LAWS AND RULES REGULATING THE NAVIGATION OF THE RIVER ABOVE TEDDINGTON.

"26. When two steam-vessels proceeding in opposite directions, the one up and the other down the river, are approaching one another so as to involve risk of collision, they shall pass one another port-side to port-side.

"27. *Steam-vessels going against the stream to give way.*—Steam-vessels navigating against the stream shall ease, and if necessary stop, to allow vessels coming down with the stream to pass clear.

"28. *Lights on steamers above Teddington.*—Every steam-vessel shall, when under way, after sunset and before sunrise, either carry the lights required for steam-vessels by Rule (5), or exhibit a bright white light on or above the stem or on the funnel.

"29. *Name of steam-vessel to be marked on bows and stern.*—The name of every steam-vessel navigating the river shall be painted or marked and kept in plainly legible characters, not less

than two inches in length, on the outside of both bows and on the outside of the stern; and such name and the residence of the owner shall be registered with the Conservators.

"30. *Penalty.*—Any person committing any breach of or in any way infringing any of these Bye-laws shall be liable to a penalty of, and shall forfeit, a sum not exceeding £5, which said penalty shall be recovered, enforced, and applied according to the provisions of The Thames Conservancy Acts, 1857 and 1864."

CORRESPONDENCE.

GENERAL AVERAGE.

To the Editor of the "Nautical Magazine."

Sir,—By some strange oversight the judgment of the Supreme Court of Judicature in the important case of *Attwood* v. *Sellars* has not been reported in any of the influential journals, to which we are accustomed to look for reports on maritime cases. The judgment was delivered on March 24th last, the Thursday immediately preceding Good Friday, which circumstance may account for its having been overlooked by the reporters, who may have been taking holiday. The case, however, is one of very great interest to shipowners and underwriters, as the judgment of the Court of Appeal has confirmed the judgment of the Queen's Bench Division of the High Court of Justice, delivered on 20th May, 1879, whereby the practice of English average-adjusters, in regard to what are called "Port of Refuge Expenses," is declared to be opposed to the principles of law, which underlies the whole doctrine of general average contribution, which is, that the loss immediate and consequential caused by a sacrifice for the benefit of cargo, ship, and freight, should be borne by all.

The English average-adjusters have, for the last seventy or eighty years, distinguished the expenses of going into port and of unloading the cargo, from the expenses of warehousing and ...ading the cargo, and of coming out of port, holding that ...l average ceases at the time when common danger is at an

end, and that the cargo expenses in warehousing and in reloading are particular average on the cargo, and the pilotage, port dues, &c., particular average on the freight. The judgment of the Queen's Bench Division of the High Court of Justice was delivered by Lord Chief Justice Cockburn, and it declared the practice of the English average-adjusters to be at variance with the legal principles of a series of judicial decisions, which must be taken to be settled law. On the other hand, Lord Justice Thesiger, who delivered the judgment of the Court of Appeal, has affirmed, on behalf of the Court, the judgment of the Court below, holding "the going into port, the unloading, warehousing, and reloading of the cargo, and the coming out of port to be parts of one act or operation contemplated, resolved upon, and carried through for the common safety and benefit, and properly regarded as continuous." His Lordship concluded his judgment by observing that in deciding that the judgment of the Court below was right and should be affirmed, "it is satisfactory to us to know that the law, as laid down in the judgment of the Court below, and of this Court, is placed upon a footing which more nearly assimilates it, in matters in which assimilation is desirable, to the law obtaining in other mercantile and maritime communities." This decision of the English Courts declares the law of England on the subject of "Port of Refuge Expenses" to be in perfect harmony with the York and Antwerp Rules, which have obtained general reception on the Continent of Europe.

VIGILANS.

INTERNATIONAL MAIL PACKETS.

To the Editor of the "Nautical Magazine."

SIR,—When I last had the pleasure of addressing you, I little thought that I should be honoured by the notice of so great an authority on International Law as Sir Travers Twiss; but as he has condescended to break a lance, I will not say, *with* me (for I had not seen his paper in the April number of the *Nautical* until my own letter was in type, neither have I attempted to controvert any statement made in his paper), yet, perhaps I may be permitted to say *upon* me, or upon the position I took up in my letter.

Under the circumstances, however, I doubt not that you will give me space for another letter on the same subject, to elucidate somewhat more fully, the propositions or rather implied deductions of my former one.

I understand Sir Travers Twiss to state that the difference I ventured to point out between the status of the packet carrying the mails between Dover and Calais, and of that carrying the mails between Dover and Ostend, is illusory, and that, therefore, there is no real difference in the position, as to rights and liabilities, of a passenger, according to whether he is on board one or the other of these steamers. I venture still to think that the difference in the condition, both of the vessel itself and of the passenger on board it, is real and substantive. It is not disputed that the vessel which carries the French mail is the property of an English railway company, and therefore, *primâ facie*, an English merchant ship, registered and owned in England, and entitled to use the British red ensign and no other.

Sir Travers Twiss draws attention to the Convention with the French Government of November, 1856, which may or may not be the latest on the subject; probably there has been one made since the entry of France into the Postal Union, but the one referred to is sufficient for my purpose. By that convention, not only vessels owned or chartered by the respective Governments, but also vessels *subsidized* by those Governments may be used in the Postal service. In the Belgian Convention of 1876 there is no mention of vessels *subsidized*, but only of those owned or chartered.

Sir Travers Twiss then asserts that the vessels belonging to the railway company are chartered by the French Government for the day service, and that they fly the French flag and are manned by crews of the French Naval Service. Now, although I do not dispute the possibility of a vessel being chartered for twelve hours out of every twenty-four, or for a voyage from Calais to Dover and back each day, I do very much doubt whether such is the fact with regard to these vessels. I think it, at all events, more probable that they are subsidized and not chartered. I do not think it likely that the freight, if any, and passage money earned during the day ...ge accrue to the French Government, and that similarly

earned in the night voyage to the railway company or to the English Government. Moreover, I see in the *Times* daily, "The Chatham and Dover Company's splendid new twin steamship, *Calais-Douvres*," advertised as running in connection with the mail trains, and in the following advertisement, "The *Calais-Douvres*, specially appointed by the French Government for the conveyance of the day mails," which arrangement seems more consistent with a subsidy than a charter.

As to the boats carrying the French flag, if it is anything more than a compliment to the French nation I have great doubts as to its legality. An English-owned vessel flying the French flag would appear to come under the provisions of s. 103 (2) of the Merchant Shipping Act, 1854, and be liable to forfeiture to the Crown (*The Annandale*, 2 P.D. 179, 218), neither would it be lawful, apparently by the law of France, for, "Le Pavillon est le signe distinctif apparent du caractère national d'un navire" (Ortolan, Diplomatie de la Mer, Liv. II., Ch. IX., p. 174), and the law of 9 Juin, 1854, Art. 11, modifying the former law on the subject, requires that half at least of the owners of a vessel should be French subjects to entitle her to the privileges of a French ship. The fact, under these circumstances, of the boats carrying a French flag, gives them no privileges, but quite the reverse, as they cannot contend that they are not French whilst carrying it, whilst any person can elect to proceed against them either by English or French law as may be most convenient (*The Laura*, 12 L.T. Rep. N.S. 685, *R.* v. *Sven Seberg*, L.R. 1 C.C.R. 264). Sir Travers Twiss does not state whether, in addition to the French ensign, which is the same for merchant vessels as vessels of war, these boats ever fly the pendant, the special distinguishing mark of vessels of war. I do not profess to have so large an acquaintance with these vessels as Sir Travers Twiss, but I do not think I have ever observed one flying; if, however, they do fly a pendant, the Convention being mutual, the vessels would appear to be entitled equally, on the alternate voyages, to the white ensign and pendant, the distinctive marks of a British vessel of war, in spite of s. 105 of the Merchant Shipping Act, 1854, and Ch. II., ss. 11 & 12 of the Queen's Regulations

and Admiralty Instructions, 1879, but it will not be contended that they ever use those emblems, and if they did they would doubtless incur a penalty (*R.* v. *Ewen*, 2 Jur. N.S. 454).

For my part, when I have found myself for the nonce under the French ensign, I have always supposed it to be simply a compliment to that nation, and not entailing any serious legal consequences.

As to the fact of the officers and crews being a portion of the French Military Marine Force, as Sir Travers Twiss asserts it as a fact, he is no doubt correct, but what then. There is no obligation now on owners of British vessels to employ British subjects, and if the French officers hold English certificates of competency or service they may lawfully command English ships. If they do not, it is a question for Board of Trade or Custom House authorities under s. 136 of the Merchant Shipping Act, 1854. It is, I believe, a very much more common thing for French Naval officers, *en retraite*, to seek and obtain employment in the Merchant Service than it is for our own when on half-pay, and I believe they are encouraged to do so by the regulations of the French Government, and an employment which kept them constantly at home, would, no doubt, be especially popular. But such employment of a French commissioned officer, even on board a French ship, could not possibly convey of itself to such a ship the rights and privileges of a vessel of war, still less could it establish the relations between officers and passengers or crew that exist on board a vessel of war. I take it that the commission must be not only that of the officer, but of the ship itself. These vessels moreover at all times carry the passenger certificate of the Board of Trade, ss. 317, 318, Merchant Shipping Act, 1854.

If any attempt were made to violate the liberty of a British subject, or, indeed, of any one claiming the protection of English law, on board these boats, by rendering him liable to either the military or civil criminal code of France, whilst in a British port or on the high seas, these questions would speedily be settled (*R.* v. *Lesley*, 29 L.J. (M.C.) 101); till then they are unimportant.

·t the *Parlement Belge* "has been, by the Sovereign of Belgium, ·he usual means, declared to be in his possession as Sovereign

and to be a public vessel of the State" (the *Parlement Belge*, 42 L.T. Rep. N.S. 273), and therefore presumably the law on board is that in force in a public vessel of the State, *i.e.*, a man-of-war of that nation.

As to the civil liability for damage, there is no doubt that the railway companies consider themselves, notwithstanding the arrangement, of whatever nature it be, with the Post Offices of England and France, as still owners of the ships and liable for the consequences of accidents on board them. That is shown by the conditions on which passengers are booked (*Burke* v. *S. E. Rail. Co.*, 5 Q.B.D. 1; *Zunz* v. *S. E. Rail. Co.*, L.R. 4 Q.B. 539) and they are so considered by the Courts (*Jones* v. *L. C. & D. Rail. Co.*, "Mitchell's Maritime Register," 1879, p. 629), though if the convention is valid, such liability may not be enforced by an arrest of the ship, but by personal action against the owners, though the immunity from arrest would only extend whilst under the charter, or otherwise, within the terms of the Convention, or for twelve hours out of twenty-four (*The Ticonderoga*, *Swabey*, 217). The decision of the Court of Appeal in the case of the *Parlement Belge*, on the other hand, is that no suit *in rem* will lie against the ship, because a proceeding *in rem* is a proceeding to compel the appearance of a defendant who, being "a Sovereign, cannot personally be impleaded in any Court," *à fortiori*, therefore, an ordinary Common Law action *in persona* will not lie against him for the consequences of the negligence of his servants.

I hope, therefore, I have shown that there is a difference of a very decided nature between the status of the *Calais-Douvres*, for example, and that of the *Parlement Belge*, and as a consequence, between the rights and liabilities of a passenger on board one or the other of those boats.

The only effect of the convention, supposing it to be of full force and effect, is that the Calais boats should be treated as men-of-war, that is, so far as the relations of the State with the ship are concerned, in allowing it to be free from detention, &c., for the common good of the subjects of the State, but not to free its owners from liability for the acts of those who are still

their servants, if there has not been a regular demise of the ships (*Steel* v. *Lister*, 8 C.P.D. 121.)

As to the effect of Sir Robert Phillimore's judgment, which Sir Travers Twiss objects to my saying "must be considered conclusive," in the first place, I only cited it in speaking of a possible remedy for the present anomalous state of affairs, so far as regards these steam-packets. It is not necessary to rely on it to show that the anomalies exist, for that purpose I refer entirely to the judgment of the Court of Appeal; and, of course, I would not maintain for a moment that, under the circumstances of the case, the decision of Sir Robert Phillimore would bind a court of co-ordinate jurisdiction; I am not aware that any judgment absolutely does that, still less that it should bind a court of superior jurisdiction. I merely say that it is a decision of a point of law, which the learned judge considered it necessary to decide. That is, it is a decision of a learned judge, if I may venture to say so, specially versed in International Law, and who has administered it more than any judge on the bench for many years past, and of which the Court of Appeal say: "We neither affirm nor deny the propriety of the learned judge's decision."

It is, therefore, if I may somewhat loosely borrow the expression, a decision *ex cathedrâ* and not a mere *obiter dictum*, and therefore one entitled to greater weight for example, than any opinions expressed in irresponsible text books.

But I have only used it for the purpose of showing what means might be adopted prospectively to get rid of an anomaly, and if the decision is wrong, possibly the anomaly may be the more easily got rid of. But the anomaly is, I think I have shown, in existence, whether the decision of Sir Robert Phillimore be correct or not.

Apologizing for taking up so much space,

I remain, yours faithfully,

SEA LAWYER.

Temple, May 8, 1880.

BOOKS RECEIVED.

A Treatise on the Law of Collisions at Sea, &c., &c., by Reginald G. Marsden, of the Inner Temple, Barrister-at-Law. London: Stevens & Sons, 119, Chancery Lane. 1880.

This book will be acceptable to shipowners, underwriters, maritime lawyers, and writers on maritime subjects, and to most masters and officers in our Mercantile Marine. Years ago seamen as a rule hated law; as regards the Rule of the Road at sea, although they had no difficulty in appreciating the rules nautically, yet, with respect to the law of the matter, they were oftentimes far from comprehending its significance, and frequently confused themselves in a hopeless manner in their efforts to solve the legal problems arising out of the rules. But in these days things are different. Masters and officers have recently had so much experience of the law courts, and are still so liable to have to appear before legal tribunals to answer various charges, that they require to have some knowledge of Mercantile Marine law to enable them to defend themselves and their certificates. Such a treatise as that now before us cannot therefore fail to be of great value to master mariners, more especially considering that the subject is treated in a clear, practical, and comprehensive manner. The author has brought his work up to the latest date and gives the new Rules of the Road at Sea which are to come into operation on 1st September next, and also the new bye-laws and rules for the regulation of the navigation of the Thames, which are in force from the 1st June (instant.)

The work is one which no doubt will take its place as a standard volume of reference on collisions at sea, and we can only say that a perusal of it has given us reason to congratulate ourselves on having so useful an addition to our own library of reference.

L'Année Maritime. Paris. Challamel Ainé. 5, Rue Jacob. 1879.

This useful repertoire of maritime information is now in its third year of publication, and shows indications of growth and general improvement. It appears to be faithfully compiled, and deals with the naval affairs of France and other countries as regards

their political bearing, their administration, financial resources, organisation, men, and material, and it also contains a short chapter on the Mercantile Marine. In reference to all these matters, statistical tables derived from official sources are given, which are very serviceable for reference purposes. A comprehensive volume of this kind, if well put together, ought to be successful. There is a large number of nautical men who would gladly purchase any work giving an accurate resumé of all that had occurred in the maritime world each year.

We would, however, suggest to the editor of "L'Année Maritime," that the merchant fleets of his own and other countries deserve more notice than he has given them in this issue, and further, that the important subject of lighthouses and sea-marks should not be altogether omitted in such a work as his.

We have received a copy of a song, entitled "Sail Ho! Hurra!" the words and air by Charles Robertson of the Mercantile Marine, and we have much pleasure in testifying that the air is simple but effective, and is not without some harmonious and inspiriting passages. The words of songs are seldom deserving of high commendation, but in the present case we are bound to say Mr. Robertson's verses have quite a nautical ring about them, and are appropriately wedded to the music. We should think that the words and music are well adapted for marine vocalization, and might with good effect be rendered by a deep-chested baritone in either the cabin or the forecastle.

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, *High Holborn, London, W.C.:* 6, *Lord Street, Liverpool; and at Leicester.*

ENGLISH (APPLICATIONS).

1542. Samuel Ward, South Shields. "Improvements in composition for coating ships' bottoms, and for other purposes."

1573. James Bowyer D'Arcy Boulton, Southampton Row, London. "Apparatus for facilitating repairs and other operations upon a screw propeller whilst the vessel is afloat."

1601. Maria Beasly, Philadelphia, Pennsylvania, U.S.A. "Improvements in life-saving rafts." (A communication.)

1699. William Timbrill Clark, Crick, near Rugby, and William Henry Ashwell, Bedford. "Improvements in governors for marine and other engines."

1726. Theodor Otto Ludwig Schrader, New York, U.S.A. "Improvements in ships' berths." (A communication.) (Complete specification.)

1728. Frank Ealand Todd, York. "A collapsing hand carriage for light-boats."

1729. Henry Burgess Young, Greenwich. "Improvements in marine steam engines for driving screw and other propellers."

1755. Henry Potts Scott, South Shields, and Thomas Davey Donaldson, Jarrow-on-Tyne. "An improved anti-fouling and preservative composition for coating ships' bottoms and other submerged surfaces."

1779. William Gray, Dawlish, Devon. "Improvements in steamships, especially in the construction and arrangement of the boilers."

1825. William Richardson, Limehouse, Middlesex. "Improvements in apparatus for lowering, disconnecting, picking up, and raising ships' boats."

1829. Joseph Gibbons Hill and John De Hart Harrison, both of Newark, New Jersey, U. S. A. "Improvements in floating mattresses, life-preservers, buoys, and similar articles, which invention is also applicable to boats, ships' compartments, and the like." (A communication.) (Complete specification.)

1862. Frederick Travis, Liverpool. "Improvements in and appertaining to the ventilation of ships."

1873. Ralph Hart Tweddell, Westminster. "Improved means and apparatus for riveting ships and other plated structures."

1879. William Bailey, Hull. A novel construction of storm deep-sea floating anchors."

1914. Robert Punchon, Brighton. "Improvements in the con-

struction of apparatus and in process connected therewith for raising submerged ships and vessels."

1947. Ignatz Kosztorits, Wieselburg, Hungary. "Improved apparatus for regulating or controlling the speed of the engines and propellers of screw-steamers."

1974. Joseph H. Thomas, 8, Upper Westbourne Terrace, Middlesex. "Improvements in screw-propellers."

1990. Gustav Pfann Ruche, senior, Vienna, Austria; and Gustav Pfann Ruche, junior, Westminster. "Improvements in apparatus for the propulsion and steering of vessels or ships, also applicable for other useful purposes."

AMERICAN.

225465. Myron Coloney, New Haven, Connecticut, U.S.A. "A marine torpedo."

225567. Jonathan L. Chester, South Eastor, Pa. "A paddle for boat wheels."

226238. Edgar E. Mann, Lawrence, Massachusetts, U.S.A. "A signal-buoy."

AUSTRIAN.

3788. G. H. Ewald, Leopoldau. "A system of oars for propelling ships."

BELGIAN.

50903. W. U. Fairbairn, H. S. MacClearn, and W. H. Ingersoll. "Modifications in the governors of marine engines."

FRENCH.

133177. Iverneau and Lambert, Paris. "Tidal motors."

133178. Dumoulin, Fromet. "Illuminating sea-compasses."

133250. Mackenzie. "Increasing the effective power of screw-propellers."

133254 Billhaud, Junior. "Insubmersive bathing and pleasure boats."

133256. The Fives Lille Company. "A system of navigation with traction on a submerged rail, for rivers, canals, &c."

133271. Coupey Reboux, Lille. "Lifters combined with ladders or steps and applying the same to vehicles and boats."

133276. Sloan. "Apparatus for transporting vessels."

133304. Heathorn. "An apparatus for steering vessels, boats, pedo boats, and for lessening their speed."

133865. Chaix, Marseilles. "Insubmersive lighters for transporting sea-vessels and obviating transhipments."

133371. Artige, Paris. "Improvements in the fittings of machinery and tools employed for building and repairing boats of all sorts, &c."

133387. Levoy, Marseilles. "Preserving meat and fish on board ship."

133936. Satre. "A mixed boat for sea and river navigation."

GERMAN.

9936. M. J. Nordmann, Dresden. "An apparatus with elastic brakes for steering sea and river vessels."

9972. G. J. Stevens and J. S. Smith, London. "A screw-propeller."

SPANISH.

135. P. P. De La Sala, London. "An apparatus for the manufacture of boats, rafts, pontoons, portable baths, hanging stages and other floating or fixed structures."

175. J. Goodrich, Henry, Illinois, U.S.A. "A hydraulic apparatus for propelling ships, and for other purposes."

177. J. L. Lay, Paris. "Improvements in torpedo boats and in apparatus for steering and propelling them.'

195. J. L. Lay, Paris. "A torpedo boat and apparatus for steering, stopping, and launching the same."

224. G. Giese, Bordeaux. "A submarine torpedo rocket."

230. C. Olivares y Ruiz, Madrid. "An apparatus for saving ships."

318. A. Bosch y Banares, Valencia. "Cork life-mattrasses for sea navigation."

325. J. Billhaud, Bordeaux. "A fixed and insubmersive bath-boat."

326. H. Satre, Lyons. "A lock-boat for transporting other boats."

352. W. B. Barker, Hoboken, New York. "A code and apparatus for safe sea-signals."

VICTORIAN.

2789. Zachariah Oram and Phillip Brennier Grove, both of Philadelphia, U.S.A. "Improvements in and relating to the construction of ships and vessels with twin-propellers."

SWEDISH.

4. C. F. T. Gyllencreutz. "A lifeboat."

78. W. Giesè. "A rocket apparatus for propelling torpedo boats."

122. F. L. Lindberg. "A rotary apparatus with one or more propellers."

PATENTS PUBLISHED.

Steering Apparatus.

3196. August 8, 1879. Price 6d. William Clarke. A vane is made fast on the shaft of the chain drum for operating the rudder, and is fitted so as to be capable of oscillating in an annular chamber, to which steam is admitted to act upon the vane, a suitable partition being provided to offer the necessary resistance. A valve operated by a band wheel, or otherwise, regulates the induction and eduction of steam to and from the opposite sides of the vane. By moving the valve in the desired direction, the steam is caused to act upon the vane and move it in the desired direction, and its motion being transmitted to the rudder, the ship is steered in the required course.

Ships' Lamps.

3399. August 23, 1879. Price 6d. John Blake. The circular lens constituting the chimney is supported on a metal flange, which fits to the burner. Surmounting the lens is a conical metal chimney with a flange at its base to fit the top of the lens. This chimney is supported by vertical wires within the lens, the rings to which they are connected resting on the lens holder. The head of the lamp consists of a tube, and near the top holes are pierced all round. A second row of holes is made about midway between the top and bottom of the head, and beneath them is fixed a hollow metallic cone. A horizontal perforated plate is fixed inside the head, a short distance above the top of the cone, and below the top row of holes. A telescopic chimney is formed in the head of the lamp, and when the moveable part is elevated, it allows the chimney attached to the burner to slide underneath it, and the burner and reservoir may be pushed into or withdrawn from the centre.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M.	London Bridge. P.M.	Hull. A.M.	Hull. P.M.	North Shields. A.M.	North Shields. P.M.	Leith. A.M.	Leith. P.M.	Devonport. A.M.	Devonport. P.M.	Dover. A.M.	Dover. P.M.	Weston-super-Mare. A.M.	Weston-super-Mare. P.M.	Liverpool. A.M.	Liverpool. P.M.	Greenock. A.M.	Greenock. P.M.	Queenstown. A.M.	Queenstown. P.M.	Kingstown. A.M.	Kingstown. P.M.	Londonderry. A.M.	Londonderry. P.M.	Brest. A.M.	Brest. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	M.	H. M.	H. M.	H. M.	H.M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
Tu	1	8 16	8 49	0 47	1 17	10 18	10 50	9 11	9 45	11 59	—	5 21	5 49	0 34	1 4	5 35	6 9	6 13	6 43	11 28	11 59	5 37	6 7	2 55	3 26	10 26	10 59
W	2	9 20	9 54	1 46	2 14	11 20	11 48	10 14	10 42	0 33	1 7	6 17	6 46	1 31	2 6	6 43	7 14	7 13	7 44	—	0 30	6 35	7 1	3 52	4 16	11 32	—
Th	3	10 25	10 56	2 41	3 8	—	0 16	11 10	11 37	1 41	2 13	7 18	7 49	2 39	3 12	7 45	8 15	8 16	8 47	1 3	1 36	7 30	7 59	4 40	5 2	0 5	0 35
F	4	11 27	11 53	3 35	4 2	0 43	1 8	—	0 2	2 42	3 9	8 18	8 44	3 44	4 16	8 41	9 5	9 15	9 42	2 5	2 33	8 27	8 54	5 24	5 46	1 2	1 28
S	5	—	0 22	4 29	4 54	1 32	1 54	0 26	0 48	3 25	3 59	9 9	9 33	4 45	5 11	9 28	9 49	10 7	10 30	2 59	3 23	9 19	9 43	6 8	6 30	1 52	2 14
S	6	0 44	1 6	5 15	5 36	2 15	2 35	1 9	1 30	4 22	4 44	9 55	10 17	5 36	5 59	10 9	10 29	10 52	11 14	3 46	4 8	10 4	10 22	6 51	7 12	2 35	2 55
M	7	1 27	1 48	5 57	6 17	2 53	3 11	1 51	2 10	5 4	5 24	10 38	10 59	6 20	6 41	10 49	11 8	11 35	11 55	4 28	4 47	10 40	10 58	7 32	7 51	3 14	3 32
Tu	8	2 8	2 25	6 36	6 54	3 29	3 47	2 28	2 45	5 42	6 0	11 19	11 38	7 0	7 18	11 26	11 44	—	0 14	5 6	5 25	11 15	11 32	8 8	8 24	3 50	4 8
W	9	2 42	2 59	7 12	7 30	4 4	4 21	3 1	3 18	6 17	6 34	11 57	—	7 36	7 54	—	0 2	0 32	0 50	5 43	6 1	11 50	—	8 40	8 56	4 26	4 44
Th	10	3 16	3 33	7 48	8 5	4 39	4 57	3 35	3 52	6 50	7 6	0 16	0 35	8 11	8 27	0 20	0 38	1 8	1 26	6 19	6 37	0 8	0 26	9 12	9 28	5 1	5 18
F	11	3 50	4 9	8 22	8 40	5 15	5 34	4 10	4 29	7 22	7 37	0 54	1 13	8 44	9 1	0 56	1 13	1 44	2 2	6 55	7 13	0 44	1 3	9 45	10 2	5 35	5 53
S	12	4 27	4 45	8 58	9 17	5 53	6 12	4 48	5 7	7 54	8 12	1 32	1 52	9 18	9 35	1 30	1 48	2 19	2 37	7 31	7 49	1 22	1 41	10 20	10 40	6 12	6 31
S	13	5 3	5 21	9 36	9 56	6 32	6 53	5 27	5 49	8 30	8 49	2 12	2 32	9 52	10 9	2 7	2 26	2 56	3 15	8 7	8 26	2 1	2 22	11 1	11 26	6 51	7 11
M	14	5 40	6 0	10 17	10 40	7 15	7 39	6 12	6 35	9 9	9 30	2 53	3 14	10 26	10 45	2 46	3 7	3 35	3 56	8 46	9 8	2 44	3 7	11 55	—	7 33	7 57
Tu	15	6 23	6 47	11 7	11 37	8 5	8 34	7 1	7 29	9 53	10 17	3 36	4 0	11 7	11 30	3 30	3 55	4 19	4 44	9 31	9 54	3 32	3 59	0 26	1 0	8 22	8 48
W	16	7 13	7 41	—	0 7	9 4	9 35	7 58	8 28	10 44	11 13	4 24	4 48	11 54	—	4 23	4 53	5 9	5 35	10 18	10 46	4 28	4 57	1 35	2 10	9 15	9 44
Th	17	8 9	8 37	0 37	1 7	10 7	10 39	8 59	9 32	11 46	—	5 12	5 39	0 22	0 53	5 25	6 0	6 3	6 34	11 18	11 51	5 27	5 57	2 44	3 16	10 17	10 51
F	18	9 9	9 44	1 37	2 7	11 11	11 42	10 5	10 36	0 23	1 1	6 8	6 39	1 26	2 0	6 35	7 9	7 6	7 38	—	0 25	6 27	6 57	3 45	4 12	11 26	—
S	19	10 17	10 50	2 37	3 7	—	0 13	11 6	11 35	1 38	2 15	7 13	7 47	2 35	3 11	7 41	8 12	8 11	8 44	0 59	1 34	7 27	7 58	4 37	5 1	0 1	0 34
S	20	11 24	11 55	3 37	4 7	0 42	1 11	—	0 4	2 49	3 22	8 21	8 53	3 49	4 27	8 43	9 13	9 18	9 50	2 9	2 42	8 30	9 3	5 25	5 58	1 6	1 37
M	21	—	0 26	4 37	5 6	1 39	2 6	0 33	1 1	3 53	4 23	9 24	9 54	5 2	5 34	9 41	10 8	10 21	10 51	3 14	3 44	9 34	10 2	6 21	6 49	2 6	2 34
Tu	22	0 54	1 24	5 35	6 3	2 33	2 59	1 29	1 56	4 52	5 20	10 24	10 54	6 6	6 36	10 35	11 2	11 21	11 50	4 14	4 43	10 28	10 54	7 17	7 45	3 1	3 28
W	23	1 52	2 19	6 31	6 59	3 25	3 51	2 22	2 48	5 47	6 14	11 24	11 52	7 5	7 32	11 29	11 56	—	0 19	5 11	5 38	11 20	11 46	8 11	8 35	3 55	4 21
Th	24	2 45	3 12	7 25	7 50	4 17	4 42	3 13	3 38	6 40	7 4	—	0 19	7 56	8 20	—	0 22	0 46	1 12	6 4	6 29	—	0 11	8 58	9 21	4 46	5 10
F	25	3 36	4 1	8 14	8 38	5 7	5 32	4 3	4 28	7 27	7 50	0 46	1 12	8 43	9 5	0 47	1 11	1 36	2 0	6 53	7 17	0 36	1 1	9 44	10 7	5 34	5 58
S	26	4 24	4 49	9 2	9 26	5 57	6 22	4 52	5 16	8 13	8 34	1 37	2 2	9 27	9 48	1 34	1 57	2 24	2 47	7 40	8 8	1 26	1 51	10 30	10 53	6 21	6 44
S	27	5 14	5 37	9 50	10 14	6 46	7 10	5 41	6 6	8 54	9 14	2 26	2 50	10 8	10 26	2 20	2 43	3 10	3 33	8 25	8 46	2 16	2 41	11 19	11 48	7 7	7 30
M	28	6 0	6 22	10 38	11 2	7 35	8 0	6 31	6 56	9 35	9 56	3 13	3 34	10 44	11 2	3 5	3 27	3 56	4 17	9 6	9 27	3 6	3 29	—	0 18	7 53	8 16
Tu	29	6 47	7 9	11 28	11 57	8 26	8 53	7 22	7 49	10 17	10 40	3 56	4 18	11 23	11 46	3 49	4 14	4 38	5 1	9 48	10 12	3 53	4 19	0 49	1 23	8 40	9 6
W	30	7 34	7 59	—	0 27	9 22	9 54	8 18	8 49	11 5	11 31	4 40	5 4	—	0 14	4 42	5 12	5 26	5 54	10 38	11 8	4 47	5 16	1 57	2 32	9 34	10 5

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ a
— *sub.*), to the time of high water on the given day at the port of reference, y
have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 18	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 3	Brest
Boulogne	+0 18	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 28	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 38	Devonport
Deal & Downs	+0 3	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 3	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 58	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Heligoland	+0 21	Dover
Holyhead	−1 12	Liverpool
Holy Island harbour	−0 58	N. Shields
Honfleur	+5 42	Brest
Inverness	−1 59	Leith
Jersey (St. Helier)	+2 33	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-M
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-M
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-M
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 18	Dover
Padstow	−1 41	Weston-s.-M
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-M
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-M
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-M
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-M
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 43	London
Youghall	+0 13	Queenstown

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
181	England—Thames Entrance—Princes Channel	Light-vessel marking wreck.
182	„ East Coast—Humber River—Ancholme Channel	New light.
183	Ireland—South-east Point—Carnsore Point—Barrels Rock	Intended light-vessel.
184	„ East Coast—Lough Larne	Visibility of light and change in buoyage.
185	North Sea—Ems River—Borkum Flat	Light-vessel to be altered in position.
186	„ Jade River—Wangeroog	Fog-signal damaged.
187	„ Elbe River—Pilot Stations	Alterations.
188	Baltic Entrance—Kattegat—Lœso Island	Alteration in various lights.
189	Norway—South Coast—Skagerrak—Kragero	New harbour light.
190	„ „ Christiania Fiord	Particulars of Homlungen light.
191	Baltic Entrance—Sound—Flint Channel	Pilot vessel and fog-signal off Malmo Outer Road
192	„ „ Raa Sound	Period of exhibition of harbour light.
193	Baltic—Finland—Aland Islands—Bogskar	Intended light.
194	„ Gulf of Bothnia—South Quarken Channel	Intended alteration of Understen.
195	„ „ Sweden—Ronnskar	Intended leading light.
196	Norway—West Coast	Particulars of certain lights.
197	Portugal—West Coast—Cape Sines	New light.
198	Mediterranean—France—Toulouse—Outer Road	Light-vessel near Vieille pier.
199	„ Adriatic—Fiume	Altered harbour lights.
200	„ Archipelago—Syra Island—Syra Harbour	Particulars of Mole lights.
201	North Atlantic—Canary Island—Teneriffe—Santa Cruz	Temporary discontinuance of Mole head lights.
202	India—Bay of Bengal—Madras Road	Buoys altered.
203	Sumatra—West Coast—Padang—Pulo Pisang Besar	New harbour light.
204	China Sea—Banka Island	Reported sunken danger off N.E. coast.
205	„ „	„ „
206	China—East Coast—Yangtse-Kiang—Wusung River	Lismore wreck light-vessel replaced.
207	Japan—Kiusiu	Various lights.
208	„ Nipon Island—Strait of Tsugar—Siriya Saki	Fog-signal altered.
209	Australia—East Coast—Great Sandy Strait	Various leading lights.
210	South Australia—Gulf of St. Vincent—Port Adelaide	Exhibition of beacon lights.
211	South America—Brazil—Rio de Janeiro	Particulars of time-signals.
212	„ „ Approach to Para River	Sunken danger.
213	„ Venezuela—Margarita Island—Ballena Point	Non-existence of light.

MONTHLY ABSTRACT OF NAUTICAL NOTICES—*continued.*

No.	PLACE.	SUBJECT.
214	WEST INDIES—Martinique—Fort Royal Bay	Light for mail steamers.
215	„ Cuba—North Coast	Reported sunken danger.
216	UNITED STATES—New York—Sandy Hook	Spar-buoy on spit and fog-signal
217	„ Massachusetts—Newbury-port	Automatic signal-buoy.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

181.—ENGLAND.—*Thames River Entrance.—Light-Vessel marking Wreck in Princes Channel.*—A vessel exhibiting two lights, one on each end of a yard, has been placed to the eastward of the ship *Calypso*, sunk in Princes channel. The wreck lies in 7 fathoms at low water spring tides, with the following bearings and distances, viz.:—Princes channel light-vessel, N.E. by E. ¾ E., distant 2¼ cables; North Tongue buoy, S.E. ¼ S., distant 9 cables. The masts are all visible, and a light will be exhibited from the port mainyard-arm of the wreck. *Variation,* 17¾° *Westerly in* 1880.

182.—ENGLAND.— *East Coast.— Humber River.— Light for Ancholme Channel.*—To facilitate the navigation of Ancholme channel, an *amber* coloured light is now exhibited from a beacon-post erected on a groin or stone heap, situated about one mile westward of Ferriby sluice haven, on the southern shore of Humber river.

183.—IRELAND.—*South-East Coast.—Carnsore Point.—Intended Light-Vessel off Barrels Rock.*—As soon as circumstances will admit after 1st September, 1880, it is intended to place a light-vessel 2 miles south of the Barrels rock, situated to the south-west of Carnsore point. The light will be *red*, showing *two flashes* in quick succession *every thirty seconds*, and visible 10 miles. The light-vessel will be painted black with narrow white streak, and the words *Barrels rock* on her sides.

Note.—Mariners are cautioned that passing inside Barrels rock light-vessel will be attended with danger. Further notice with

particulars concerning this light-vessel will be given. *Variation*, 21° 40′ *W.*

184.—IRELAND.—*East Coast.—Lough Larne.*—(1.) *Farres Point Light.—Limit of Visibility.*—The sector of red light is shown between the bearings of S.W. by W. and S.W. by W. ⅞ W., to guard Hunter rock—on the last named bearing the light is intercepted by Barr point, and is not visible when to the eastward of that bearing.

(2.) *Hunter Rock.—Alterations in Buoyage.*—The following alterations have been made in the buoys marking Hunter rock, at the entrance to Lough Larne. The wreck buoy, formerly situated 80 yards N. by E. of Hunter rock, has been replaced by a *first-class conical* buoy, painted black with staff and cage, and marked *North Hunter's rock*; it lies with the following bearings, viz.:—Arch at Black Cave head, W. by N. ¼ N; Farres point lighthouse, S.W. by W. ¼ W.; Coastguard station, port Muck, S. ⅛ W. The former can buoy southward of Hunter rock, has been replaced by a *first-class conical* buoy, painted black and marked *South Hunter's rock*; it lies with the following bearings, viz.:—Arch at Black Cave head, W. by N. ½ N.; Farres point lighthouse, S.W. by W. ½ W.; Coastguard station, port Muck, S. ⅛ W.

Note.—The least depth on Hunter rock at low water is found to be 4½ feet. *Variation*, 22½° *W.*

185.—NORTH SEA.—*Ems River.—Borkum Flat Light-Vessel.—Intended alteration in Position.*—At the end of June, 1880, this light-vessel will be moved W. by N. ½ N. 7 miles from her present position, and will then lie with the following bearings and distances, viz.:—Borkum lighthouse, S.S.E. ½ E., distant 19 miles; Schiermonnikoog western lighthouse, S.S.W. ½ W., distant 20 miles. Position approximate, lat. 53° 49′ N., long. 6° 16½′ E. *Variation*, 15¼° *W.*

186.—NORTH SEA.—*Jade River.—Wangeroog Island Fog-Signal.—Machinery Damaged.*—It is necessary (should the fog be of long continuance) to pause every four hours for about half-an-hour with the delivery of the fog-signal. Further notice will be given when the repairs of the machinery are completed.

187.—NORTH SEA.—*Elbe River Entrance.*—(1.) *Alteration in*

Pilot Vessel's Position.—The outer station of the pilot vessel below Cuxhaven is now in mid-channel between white buoy No. 1 and black buoy A, in 10 fathoms water, E.S.E. from light-vessel Elbe, No. 1 (*Gustav Heinrich*), distant $2\frac{8}{10}$ths miles. Position, lat. 53° 59′ 55″ N., long. 8° 22′ 45″ E. *Variation*, 14¼° *W.*

(2.) *Additional Pilot Station.*—Also, a pilot station has been established on board the light-vessel Elbe, No. 3 (*Jacob Heinrich*), in addition to the ordinary pilot station at light-vessel Elbe, No. 2 (Caspar).

Note.—Elbe light-vessel No. 3 will carry a black globe on the mainmast instead of the usual red flag with white square; also, a flag at the foremast head when pilots cannot be taken on board Elbe light-vessel No. 2—if however this flag is not shown, pilots may be discharged (the customary signal being made) at either of the stations.

188.—Baltic Entrance.—*The Kattegat.*—*Læso Island.*—(1.) *Alteration in Trindelen Light.*—About the end of May, 1880, the following alteration will be made:—The *fixed* light now shown will be discontinued, and instead thereof, a *white* light will be exhibited, showing a *flash* every *thirty seconds.* The light-vessel will have two masts (fore and jigger) and will carry a red globe at the fore masthead.

(2.) *Alteration in Kobber Ground Light.*—About the end of May, 1880, the following alteration will be made:—The three fixed lights now shown will be discontinued, and instead thereof, *one fixed white* light will be exhibited. The light-vessel will be schooner rigged, and will carry a red globe at the fore masthead.

(3.) *Alteration in Anholt Knobben Light.*—About the end of May, 1880, the following alteration will be made:—The fixed light now shown will be discontinued, and instead thereof, a *white* light will be exhibited showing *two flashes* in quick succession *every minute.* The light-vessel will have two masts (fore and jigger) and will carry a red globe at the fore masthead. At the same date, a *Syren fog-signal*, worked by a caloric engine, will be established at Anholt Knobben light-vessel, which, during thick and foggy weather, will give *three powerful blasts* in quick succession *every two minutes.*

Note.—From the day the above alterations are made to the 31st May, 1880, Skaw reef and Drogden light-vessels will fly the Danish flag above the globe at the masthead.

189.—NORWAY.—*South Coast.*—*The Skagerrak.*—*Light in Kragerö Harbour.*—It is a *fixed* light, showing *red* in the channel between Hammerboen and Butteboen, also over Galeiodboerne; and *white* in other directions. Position, lat. 58° 52′ N., long. 9° 25′ 10″ E.

Note.—This light is only shown in the winter, as long as the channel in the vicinity is clear of ice.

190.—NORWAY.—*South Coast.*—*The Skagerrak.*—*Christiania Fiord.*—*Particulars of Homlüngen Light.*—It is visible from the bearing of S.E. by E. ⅜ E. (through north) round to W. by N. ⅜ N., this bearing leads southward of Pillerene. It shows *red* between the bearings of S.E. by E. ⅜ E. and E. by S. ⅛ S., and white over the remaining portion of the arc. The lighthouse is painted yellow.

Note.—Homlüngboen shoal is situated S.W. ¼ S. from Homlüngen lighthouse, distant about 1¼ cables. *Variation*, 18¼° *W.*

191.—BALTIC ENTRANCE.—*The Sound.*—*Flint Channel.*—*Pilot-Vessel off Malmö Outer Road.*—The pilot-vessel is stationed in Flint channel, off Malmö outer road; it is plainted black, with the word *Lots* on her sides, has a signal mast and gaff with look-out house forward, and is moored with Kalkgrund and Oscargrund light-vessels in line, distant 2½ miles from Kalkgrund light-vessel, and bearing N. 32° W., from Malmo outer lighthouse. At night—two *white* lights (vertical and 3 feet apart) will be exhibited from the gaff of this vessel, should there be pilots on board, also a riding-light; but with no pilots on board, one *white* light only will be shown from the gaff. During the day and with pilots on board, a blue and white flag will be shown from the vessel's masthead.

Note.—This vessel will only leave her station, when necessitated by ice to do so.

Also during thick or foggy weather a *bell* will be sounded from this pilot-vessel *four* times every *two minutes*—and with it *fog-signals* from passing vessels *will be answered*. *Variation*, 12° *W.*

192.—BALTIC ENTRANCE.—*The Sound.*—*Raa Sound Harbour*

Light.—Period of Exhibition.—The fixed green light on the pier at Raa, south side of northern entrance to The Sound, will in future be exhibited from 1st August to 30th April.

193.—BALTIC.—*Finland.—Aland Islands.—Intended Light on Bogskär.*—From a lighthouse erected on the western Bogskär rock, southern approach to Aland islands. It will be a *fixed white* light, varied by a *red* flash *every minute*, visible at least 16 miles. The construction of the lighthouse (iron) will be commenced in the summer of 1880, and completed in the autumn of 1881. Position, lat. 59.° 31′ 15″ N., long. 20° 25′ 40″ E. On the completion of this lighthouse, further particulars will be published.

194.—BALTIC.—*Gulf of Bothnia.—South Quarken Channel.—Understen Light.—Intended Alteration.*—In 1880, this light on the west side of South Quarken channel, will be increased between the bearings of North and N.W., also between S.S.E. and S.W. *Variation*, 7¾° *W.*

195.—BALTIC.—*Gulf of Bothnia.—Sweden.—Intended Leading Light on Rönnskär.*—In 1880, to be exhibited from the pilot's house on Rönnskär, southern approach to Piteä; it will be a *fixed red* light of small power, visible only from the channel in the vicinity. Position, lat. 65° 3′ 30″ N., long. 21° 35′ 30″ E.

196.—NORWAY.—*West Coast.—Particulars of Certain Lights.*—(1.) *Hjertnæsstrand Light* is visible between the bearings of S. ½ W. and W.S.W.; also between S. by E. and E. by S. ½ S., indicating the anchorage in Skare bay. The lighthouse, 33 feet high, is constructed of wood and painted yellow.

Note.—In order to pass westward of Halsörflue, vessels should keep within or near the limits of this light.

(2.) *Börö Light* is visible from the bearing of S. ½ W. (through west) round to E.N.E. A sector of *red* light is shown between the bearings of S.S.W. and S.W.; the light is elevated 48 feet above high water, and 40 above the ground.

(3.) *Glopen Light* (Lofoten islands) is visible seaward from the bearing of E.N.E. (through north) round to S.W. ¾ S., except where obscured by the land between the bearings of E.N.E. and N.E. ½ E.; it should be seen from a distance of 18 miles. The lighthouse is 28 feet high.

(4.) *Hekkingen Light* is visible from the bearing S. by E. ⅜ E. (through west) round to N.N.W.; it should be seen from a distance of 11 miles. The lighthouse, 24 feet high, is constructed of wood and painted yellow.

197.—PORTUGAL.—*West Coast.—Light on Cape Sines.*—From a lighthouse erected on the cape; it is a *fixed white* light, visible through an arc of 270° (from the bearing of S.W. ⅝ S. round to N.W. ⅜ W.); elevated 130 feet above high water, and visible 19 miles. The lighthouse, 75 feet high, is three-storeyed; the upper portion is cylindrical in shape. Position approximate, lat. 37° 57′ 20″ N., long. 8° 50′ 40″ W. *Variation*, 19¼° *W.* Further particulars in due course.

198.—MEDITERRANEAN.—*France.—Toulon Outer Road.—Light-Vessel near Vieille Pier.*—On the south side of entrance to Toulon outer road; on 1st April, 1880, the light would be exhibited from a light-vessel placed to mark the intended extremity of Vieille pier, bearing N. 54½° E. from Vieille point, distant 164 yards. It is a *fixed red* light, visible one mile. *Variation*, 14½° *W.*

199.—MEDITERRANEAN.—*Adriatic.—Fiume.—Harbour Lights.*—Respecting the alteration in the light exhibited from the small inner mole (Adamich) head of Fiume; the light showing *red* in an easterly and westerly direction, and *white* to the northward and southward, is in lieu of the triangular lights previously exhibited on that mole, and should be visible from a distance of 1 mile. Also, a *fixed green* light is shown from Zichy mole (westward of Adamich mole) head.

200.—MEDITERRANEAN. — *Archipelago. — Syra Island. — Syra Harbour.—Particulars of Mole Lights.*—Respecting the *fixed red* lights exhibited from the East mole of Syra harbour, they are said to be visible through an arc of 193°, or between the bearings of N. ⅝ W. and S. by E. ½ E.; they are 7 feet apart and should be seen from a distance of about 6 miles. *Variation*, 6½° *W.*

201.—NORTH ATLANTIC.—*Canary Islands.—Tenerife.—Santa Cruz.—Temporary Discontinuance of Mole Head Light.*—In consequence of damage to the mole head (during a storm on 25th November, 1879), the *fixed red* light previously shown from a moveable platform is discontinued.

202.—India.—*Bay of Bengal.—Madras Road.—Position of Northern Port Buoy Altered.*—Shifted to the position, which will form the extreme end of the north pier of the harbour. Vessels are on no account to attempt to pass between this buoy and the north pier, as the rubble base is being deposited on this line.

203.—Sumatra.—*West Coast.—Padang.—Harbour Light on Pulo' Pisang Besar.*—Exhibited from the south-west point of Pulo Pisang Besar (Pisang Gedang), southern approach to Padang road; it is a *fixed white* light, elevated 42 feet above high water, and visible 9 miles; it is shown from an iron support with iron shed on a stone pedestal—close to which is the keeper's dwelling, constructed of stone. Position, lat. 0° 59′ 55″ S., long. 100° 19′ 30″ E.

204.—China Sea.—*Banka Island.—Reported Sunken Danger on North-East Coast.*—In the northern approach to Gaspar strait: this danger (*Emerald Isle shoal*), on which the American ship *Emerald Isle*, drawing 22 feet, touched on her passage from Hong Kong to New York, is stated on the authority (dated Batavia, 8th January, 1880) of the master of the ship, to lie in lat. 0° 59′ S., long. 107° 0′—107° 5′ E. Soundings were tried for immediately after passing over the shoal, but bottom was not reached, although discoloured water was distinctly visible where the ship had touched. Position approximate, lat. 0° 59′ S., long. 107° 2½′ E.

205.—China Sea.—*Banka Island.—Sunken Danger off North-East Coast.*—In the nothern approach to Gaspar strait this danger (*Soembing shoal*) reported by H.N.M. Surveying-vessel *Soembing*, is about 220 yards in extent and steep-to, with a least depth over it of 1½ fathom and 18 to 20 fathoms around. Position, lat. 1° 53′ S., long. 106° 56′ 12″ E.

206.—China.—East Coast.—*Yangtse-Kiang.—Wusung River Entrance.—"Lismore" Wreck Light-Vessel Replaced in Position.*—The wreck of the brig *Condor* having been blown up, *Lismore* wreck light-vessel has been replaced in her former position.

207.—Japan.—*Kiusiu.—Gulf of Kagosima.*—(1.) *Kagosima.—Light on Breakwater.*—Exhibited from a staff (40 feet high and

painted white) on the northern extremity of the breakwater fronting Benten fort; it is a *fixed red* light, elevated 45 feet above the sea, and visible 6 miles. Position, lat. 31° 32′ 5″ N., long. 130° 30′ 20″ E.

(2.) *Simabara Gulf.—Intended Light at Futsinotsu.*—From a lighthouse in course of construction on the Western entrance point of Futsinotsu (Kutchinotsu) harbour, south side of Simabara; it will be a *fixed white* light. The lighthouse will be constructed of brick. Position, lat. 32° 36′ 5″ N., long. 130° 13′ 40″ E.

208.—Japan.—*Nipon Island.—Strait of Tsugar.—Siriya Saki Fog-Signal.—Alteration in Character.*—At Siriya Saki lighthouse, south side of eastern entrance to strait of Tsugar;—the signal is a steam syren, which during thick or foggy weather will give a blast of *six seconds* duration at intervals of *one minute.*

Note.—Should the machinery of the syren be out of order, or the steam not ready, the fog-bell will sound fifteen strokes per minute, as previously.

209.—Australia.—*East Coast.—Great Sandy Strait.*—(1.) *Leading Lights on Inskip Point.*—On 10th January, 1880, two leading lights would be exhibited from the western end of Inskip point, south side of southern entrance to Great Sandy strait:—The low light is *fixed white*, elevated 10 feet above high water, and visible 6 miles. Position, lat. 25° 48′ 30″ S., long. 153° 4′ 5″ E. The high light is a *fixed white*, elevated 43 feet above high water, and visible 9 miles; it bears S.E. ½ E. from the low light, distant 417 yards.

Note.—These lights kept in line, bearing S.E. ½ E. lead through Wide bay harbour and up to the Fairway buoy.

(2.) *Mary River Entrance.—Leading Lights at the Quarantine Station.*—Also, on 10th January, 1880, two leading lights would be exhibited from the Quarantine station, near the White cliffs, Tyroom road. The low light is *fixed white*, elevated 30 feet above high water, and visible 8 miles. Position, lat. 25° 24′ 20″ S., long. 153° 2′ 5″ E. The high light is *fixed white*, elevated 80 feet above high water and visible 9 miles; it bears N.E. by E. ½ E. from the low light, distant 460 yards,

Note.—These lights kept in line, bearing N.E. by E. ½ E., lead

northward of the middle bank buoy, and to Mary river entrance. *Variation*, 9¼° *E.*

210.—SOUTH AUSTRALIA.—*Gulf of St. Vincent.—Port Adelaide.—Exhibition of Beacon Lights.*—On 1st March, 1880, twelve gas lights would be exhibited from beacons erected in port Adelaide Creek. Vessels bound in must leave them all on the starboard hand.

Directions.—Vessels approaching the outer bar and entering port Adelaide at night, should bring the outer beacon (No. 12) to bear N.E. by E. This course will lead over the outer bar in not less than 18 feet at low water, and clear of Gloucester bank buoy. After passing Gloucester bank buoy, a course should be shaped to pass No. 12 beacon at the distance of a quarter of a cable; the other beacons can then be passed at a reasonable distance.

Caution.—Masters of ships should not attempt to enter at night without a pilot, unless they are well acquainted with the navigation, and then great care must be exercised, as some of the lights may be extinguished. *Variation*, 5¼° *E.*

211.—SOUTH AMERICA.—*East Coast.—Brazil.—Rio de Janeiro—Particulars of Time Signal.*—Established at the observatory on mount Castello; the time signal, of octagonal shape, 3 feet high and 3 feet broad, is painted red. It is hoisted close up (226 feet above high water) 5 minutes before noon, and dropped (26 feet) at noon, mean time at Rio de Janeiro, equivalent to 2h. 52m. 39s. Greenwich mean time. Position of observatory, lat. 22° 54′ 20″ S., long. 43° 9′ 45″ W.

212.—SOUTH AMERICA.—*Brazil.—Approach to Pará River from Eastward.— Sunken Danger off Carauassu Island.*— Particulars respecting an outlying sunken danger off Carauassu island, about 45 miles eastward of Atalaia point, Pará river entrance; this shoal (*Resolution shoal*) on which the British brig *Resolution*, drawing 15 feet, was wrecked on the 9th January, 1880, is stated on the authority of the master of the vessel, to lie with Carauassu island bearing about S.S.W. ½ W. distant 10 miles—or in (approximately) lat. 0° 38′ S., long. 46° 36′ W. The following particulars relate to the wreck of the *Resolution* :—At noon of 9th January the position by observation was lat. 0° 42′ S., long.

46° 30′ W., the course W.N.W.; at 0^h 55^m p.m., a look-out being kept from the fore topsail yard, discoloured water was reported nearly a-head, the lead giving 9 fathoms; the vessel was at once hauled to the wind on the starboard tack, heading N. by W.; the next cast of the lead gave 7 fathoms, and almost directly afterwards (about 1^h 0^m p.m.) she struck, forged her length a-head, then remained fast and became a wreck. The crew took to the boat at 3^h 30^m p.m., and landed at Anajaer point about 6^h 15^m the same evening. The position of Resolution shoal given above would place it about 12 miles to the north-west of that given for a sunken danger (reported in lat. 0° 44′ S., long. 46° 25′ W.) on which the British steam-vessel *Lisbonense* touched in June, 1872, and which was unsuccessfully searched for by H.M.S. *Dart* in September following.

Caution.—The coast between San João islands and Atalaia point should be approached with great caution, as it is said deposits from the Amazons form shifting banks at the distance of 10 or more miles from the land; the lead therefore should be constantly used. *Variation*, 3½° *W.*

213. South America.—*Venezuela.—Margarita Island.—Non-Existence of Ballena Point Light.*—The light reported as exhibited from this point, east extreme of Margarita island, does not exist.

214.—West Indies.—*Martinique.—Fort Royal Bay.—Fort de France.—Light for Mail Steamers.*—When mail steamers are expected at Fort de France, an *electric* light is exhibited from the Transatlantic Company's Dockyard.

Caution.—Vessels approaching the anchorage off Fort de France from the southward in thick weather, should be careful not to mistake this light for the white light shown from Fort St. Louis.

215. West Indies.—Cuba.—North Coast.—*Reported Sunken Danger North-Eastward of Bahia Honda.*—This danger on which the American schooner *Hattie Weston* is reported to have struck, is stated, on the authority of the master of the vessel, to be situated from 5 to 7 miles from the shore, in lat. 23° 6′ N., long. 83° 4′ W. approximate. *Variation*, 3° *W.*

216.—United States.—*Approaches to New York.*—(1.) *Spar-Buoy Northward of Sandy Hook.*—A *spar-buoy* has been placed to mark the extremity of a spit extending from the point of Sandy Hook, in a N.E. by N. direction from the East beacon. The buoy, painted black, lies in 5 fathoms water, about midway between buoys Nos. 5 and 5½, with the following bearings, viz.:—Romer beacon, N. ¾ W.; Sandy Hook principal lighthouse, S. ¼ W.; East beacon, S.W. by S.

(2.) *East River Fog-Signals proposed off Whitestone Point.*—Also, it is proposed to establish two powerful fog-signals off Whitestone point, to be worked from a boat fitted for the purpose.

Note.—This being a private enterprise, its permanency cannot be vouched for. Mariners therefore should not place absolute dependence upon the signal.

217.—United States. — *Massachusetts.* — *Automatic Signal Buoy off Newburyport.*—It is painted black, and gives blasts of a whistle at short intervals; moored off the bar of Newburyport, in 9 fathoms water, with Andrews Point, S.E. by S. ½ S.; Newburyport Main light, W. ½ S.; Newburyport Range—just open to northward of Main light.

Charts, &c., Published by the Hydrographic Department, Admiralty, in March and April, 1880.

No.		s.	d.
2242	Marmara sea:—Marmara island and Pasha Liman Group	1	6
37	China, Hainan island:—Hoi-how bay	1	6
1611	Adriatic sea:—Ports and anchorages in Dalmatia	1	6
1610	England, east coast:—North Foreland to Orfordness, including the entrance to the Thames	2	0
1697	Africa, west coast:—Garraway point to Growa point, including cape Palmas	1	6
1364	Africa, west coast:—Cape Mesurado to Baffou bay. (Plans, Junk River. Edina and Bassa. Cestos bay. Monrovia bay)	2	0

No.		s.	d.
1365	Africa, west coast :—Baffou bay to Grand Bereby, including cape Palmas. (Plans, Sinou bay. Sangwin river. Tabou to Wappoo. Poor river to Katum rock. Tabou river)	2	6
769	Plan added, St. Andrew anchorage.		
2763	Plan added, Veráwal roads.		
347	Plans added, Approaches to Pioneer river. Beverley islands anchorage.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

2172 Arctic sea :—Behring strait.
2149 Eastern archipelago :—Gaspar and Banka straits.
1664 Mediterranean :—Port Iero or Olivieri.
2328 Norway sheet 2.—Christiansand to Sandö.
2306 ———— 4.—Romdals islands to Hitteren island.
2307 ———— 5.—Smöelen island to Svee fiord.
2308 ———— 6.—Brand fiord to Lekö.
2310 ———— 8.—Donnæso to Fleina.
2311 ———— 9.—Fleina to Vest fiord and the Lofoten islands.
2312 ———— 10.—Lofoten islands to Andö.
2314 ———— 12.—Helgö to Sörö.
2316 ———— 14.—North cape to Tana fiord.
2317 ———— 15.—Tana fiord to Veranger fiord.
274 North Polar chart, Atlantic side.
278 ————, Pacific side.
2282 Arctic ocean and Greenland sea.
1319 South America, west coast :—Concepcion bay.
2822 France, south coast :—Ports Cannes and Antibes. Jouan gulf.
2607 France, south coast :—Marseille to Hyères.
521 Magellan strait :—Plans of ports.

---

		s.	d.
BOOKS.—	AFRICA PILOT, Part I. From cape Spartel to the river Cameroon, including the Azores, Madeira, Canary, and Cape Verde islands, 3rd edition, 1880	8	0

Hydrographic Notices recently Published by the Hydrographic Office, Admiralty, 1880.

No. 6.—China Sea Directory, Vol. IV. Information relating to Nakko bay, Risiri island, Yezo island.

No. 7.—Africa Pilot, Part II. Information relating to that portion of the coast of Africa from cape Frio to Walfisch bay.

No. 8.—Persian Gulf Pilot, Notice 4; Arabian coast, Ras Matbakh; information respecting shoal ground off the east coast of Barr-al-Katir.

OUR OFFICIAL LOG.

Official Inquiries at Home, 1880.

(This List is completed to the 18*th of each Month.)*

569. *Oriente*, iron; built at Seacombe, 1866; owned by J. G. Nicholson, of Liverpool; tonnage, 594; San Francisco to Liverpool; wheat in bags and chrome ore; stranded off Rhoscolyn, March 7, 1880. Inquiry held at Liverpool, April 9, 1880, before Raffles, Stip. Mag.; Castle and Wilson, N.A. Stranding caused by an error in applying the deviation of the compass to the course steered. Master censured for not using the lead.

571. *Ulster*, barque; built at St. John, New Brunswick, 1874; owned by Mr. W. A. Robertson, of St. John; tonnage, 1,059; St. John to United Kingdom; timber; abandoned at sea, about February 22, 1880. Inquiry held at Liverpool, April 10, 1880, before Raffles, Stip. Mag.; Castle and Wilson, N.A. Disaster due to perils of the sea. Master and crew justified in abandoning the vessel.

572. *Orion*, barque; built at Hylton, 1866; owned by Wm. Mears and others; tonnage, 880; New York to Gijon, Spain; maize, partly in bags, partly in bulk; abandoned at sea, about February 22, 1880. Inquiry held at Sunderland, April 9, 1880, before Potts and Scott, J.P.; Curling and Ward, N.A. Master justified in abandoning the vessel.

573. *Travancore*, s.s.; owned by the Peninsular and Oriental Steam Navigation Co.; tonnage, 1,172; Alexandria to Brindisi; passengers and cargo; lost near Cape Otranto, March 8, 1880. Inquiry held at Westminster, before Rothery, Wreck Commissioner; Forster, Pickard and Beasley, N.A. Master and second officer to blame in setting too westerly a course, and for proceeding at full speed, and not using the lead in a fog. Certificates suspended for three months respectively.

574. *Duncraig*, iron; built at Dumbarton, 1870; owned by Messrs. Finlayson, of Lochalsh; tonnage, 699; San Francisco to Queenstown; grain, partly in bags and partly in bulk; sustained material damage during the voyage, when one of her crew was lost. Inquiry held at Westminster, April 14, 1880, before Rothery, Wreck Commissioner; Forster and Beasley, N.A. Court found that the vessel had sufficient freeboard, and that the cargo was safely and properly stowed. No charge made against master.

575. *Llanedarne*, s.s.; built at Wallsend-on-Tyne, 1877; owned by C. E. Stallybrass, of Cardiff; tonnage, 673; Nicolaieff to Dunkirk; linseed in bulk; supposed to have foundered at sea. Inquiry held at Cardiff, April 13, 1880, before Valpy, Judge; Hight and Parfitt, N.A. No evidence to enable Court to express any opinion as to the cause of the disappearance of the vessel.

576. *Castlehill*, schooner; built at Perth, 1867; owned by J. Dunnet and another; tonnage, 81; Tyne to Castlehill; coals; supposed to have foundered at sea. Inquiry held at Newcastle, April 14, 1880, before Stephenson and Burrell, J.P.; Ward and Curling, N.A. No positive evidence was adduced as to the cause of loss, but it was assumed that she foundered in the gale of December 27, 1879.

577. *Cleanthes*, s.s.; built at Sunderland, 1871; owned by Messrs. Culliford and others; tonnage, 568; Hamburg to Sunderland; water ballast; stranded a few miles north of Scarborough, March 20, 1880. Inquiry held at Sunderland, April 12, 1880, before Potts and Wilson, J.P.; Curling and Ward, N.A. Accident due to steering too southerly a course from Heligoland. Master severely reprimanded for neglecting to use the lead.

578. *Montana*, s.s.; built at Jarrow-on-Tyne, 1873; owned by the Liverpool and Great Western Steam Company (Limited); tonnage, 2,428; New York to Liverpool; passengers and general cargo; stranded in Church Bay, March 13, 1880. Inquiry held at Liverpool, April 14, 1880, before Raffles, Stip. Mag.; White, Castle and Wilson, N.A. Master in default for neglecting to make due allowance for the ebb tide whilst proceeding up channel, and also for not using the lead in thick weather. Certificate suspended for six months.

581. *Traveller*, s.s.; built at North Shields, 1878; owned by Mr. J. L. Jones; tonnage, 108, gross; engaged as a tugboat. Inquiry held at Newport, Mon., into damage caused by a joint in the mudhole door giving way, whereby loss of life ensued, April 16, 1880, before Murphy and Benyon, J.P.; Hight, N.A.; and Ravenhill, E.A. Court held that the owner was deserving of severe censure for not having looked more carefully after the machinery.

582. *Duchess of Marlborough*, s.s.; built at Barrow in Furness, 1877; owned by the Dublin and Glasgow Sailing and Steam-Packet Co.; tonnage, 246; Dublin to Maryport; ballast; stranded on Langness Point, Isle of Man, March 11, 1880. Inquiry held at Liverpool, April 17, 1880, before Raffles, Stip. Mag.; Castle and Wilson, N.A. Casualty caused by the master over-estimating his distance from the Chickens Light, making no allowance for the set of the tide and leeway, and neglecting the lead. Certificate suspended for three months.

583. *Perthshire*, barque; built at Dundee, 1874; owned by Mr. Thos. Law, of Glasgow; tonnage, 596; Calais to Glasgow; ballast; stranded on Langness Point, Isle of Man, March 12, 1880. Inquiry held at Liverpool, April 17, 1880, before Raffles, Stip. Mag.; Castle and Wilson, N.A. Casualty caused by master having made no allowance for set of the tide and under estimating the speed of his vessel.

584. *Triumph*, schooner; built at Ellesmere, 1867; owned by Mr. J. Reney; tonnage, 73; Chester to Belfast; tiles and bricks; stranded on Langness Point, Isle of Man, March 12, 1880. Inquiry held at Liverpool, April 17, 1880, before Raffles, Stip. Mag.;

Castle and Wilson, N.A. Accident caused by master steering too fine a course, and making no allowance for set of tide.

585. *Musgrave*, s.s.; built at St. Peters-on-Tyne, 1871; owned by Mr. J. Miller and others; tonnage, 141; Middlesborough to Grangemouth; pig iron; stranded on Car Craig, Firth of Forth, March 12, 1880. Inquiry held at Leith, April 20, 1880, before McIntosh and Wilkie, Judges; White, Curling and Ward, N.A. Accident caused by a neglect to use the lead after passing Burntisland. Master's certificate suspended for three months.

588. *Hindoo*, s.s.; built at Hull, 1872; owned by Messrs. Wilson, Sons and Co.; tonnage, 2,360; New York to Hull; cattle, wheat, &c.; abandoned at sea, about February 22, 1880, when loss of life ensued. Inquiry held at Hull, April 22, 1880, before Twiss, Judge; Grant, Forster, and Beasly, N.A. Master fully justified in abandoning the vessel.

589. *Uganda*, schooner; built at Bideford, 1864; owned by John Williams and others; tonnage, 137; Swansea to Plymouth; anthracite. Inquiry held at Swansea, April 25, 1880, in the circumstances attending the damage sustained by the vessel through an explosion of coal gas, March 13, 1880, before Fowler, Judge; Hight and Parfitt, N.A. Accident caused through defective ventilation for which the master was responsible, as he had been expressly warned of the dangerous nature of the cargo. He, however, held no certificate.

590. *Dowlais*, s.s.; built at Jarrow-on-Tyne, 1879; owned by Mr. J. A. Gibbs and others; tonnage, 710; Bilbao to Cardiff; iron ore and 3 passengers; lost on the Runnelstone, south of Lands End, March 26, 1880, when two lives were lost. Inquiry held at Cardiff, March 26, 1880, before Valpy, Judge; Hight and Parfitt, N.A. Casualty caused by striking on the rock in a dense fog in spite of the precautions that were taken to avoid danger.

593. *Ramsey*, lugger, and *Brooklyn*, s.s.; the former built at Ramsey, Isle of Man, 1878; owned by Mr. R. Cowley and others; tonnage, 35; on a fishing cruise. The latter built at Glasgow, 1869; owned by The Mississippi and Dominion Steamship Co.; tonnage, 2,355; Liverpool to Portland, U.S.; general cargo and

50 passengers; in collision off the Irish coast, March 12, 1880, whereby loss of life ensued. Inquiry held at Liverpool, April 24, 1880, before Raffles, Stip. Mag.; Powell, Comyn, and Anderson, N.A. Master and officers of steamer acquitted of blame as the lugger had not the regulation lights duly exhibited.

594. *Amanda*, s.s.; built at West Hartlepool, 1877; owned by Mr. O. Trechman and others; tonnage, 809; Ria Marina, Elba to Barrow; iron ore; stranded off St. Bees Head, March 9, 1880. Inquiry held at Middlesborough, April 23, 1880, before Coleman, Judge; Castle and Wilson, N.A. Casualty caused by the chief officer not calling the master when the weather thickened. Certificate as master suspended for three months and recommended for one as mate during that period.

595. *Maude*, s.s.; built at West Hartlepool, 1870; owned by Messrs. Watson, Acton, and others; tonnage, 495; Huelva to Hull; copper ore; lost on the island of Ushant, March 17, 1880. Inquiry held at Hull, April 24, 1880, before Twiss, Judge; Forster and Beasley, N.A. Master in default for neglecting to verify his position from time to time, and for not using the lead. Certificate suspended for four months and recommended for one as mate.

598. *Isabella*, barque; built in the United States in 1853; owned by Mr. Thos. R. Miller and others; tonnage, 1,067; Pensacola to Dublin; timber; abandoned at sea, February 13, 1880. Inquiry held at Newcastle, April 26, 1880, before Gregson and Stephenson, J.P.; Forster and Beasley, N.A. Abandonment justifiable.

600. *Kersland*, schooner; built at Paisley, 1878; owned by Mr. J. Walker; tonnage, 99; Glasgow to Seville; pig iron; supposed to have foundered at sea. Inquiry held at Glasgow, April 28, 1880, before Swan and McLellan, Justices; Curling and Ward, N.A. Loss probably due to shifting of cargo for want of proper shifting boards.

601. *Scythia*, barque; built at Seacombe, 1868; owned by Mr. W. Nicol, of Liverpool; tonnage, 886; Cardiff to Payta (Peru); coals; supposed to have foundered at sea. Inquiry held at Liverpool, April 27, 1880, before Raffles, Stip. Mag.; Wilson and French, N.A. Court held that the vessel having left port in a

perfectly seaworthy condition, and the ventilation arrangements being satisfactory, it was impossible to assign a cause for her loss.

602. *Carfin*, s.s.; built at Glasgow, 1877; owned by Mr. J. M. Thomson; tonnage, 765; Glasgow to Bilbao; water ballast and pig iron; stranded on the Gantock Rocks, off Dunoon, March 19, 1880. Inquiry held at Glasgow, April 26, 1880, before McLellan and Swan, Justices; Curling and Ward, N.A. Master and mate both in default; the master for leaving the bridge whilst proceeding through a narrow channel, and the mate for failing to keep the vessel on a safe course. Certificates suspended for six months respectively.

603. *Cerwyn*, s.s.; built at South Shields, 1873; owned by Mr. E. Handcock; tonnage, 206; Bilbao to Newport, Mon.; iron ore; stranded on the Saints Rocks, March 27, 1880, whereby loss of life ensued. Inquiry held at Falmouth, April 27, 1880, before Webber and Bennett, J.P.; Hight and Parfitt, N.A. Casualty caused by a serious error in the ship's reckoning, either from an error in the compass or from an unknown current.

604. *Stornoway*, ship; built at Quebec, 1868; owned by Mr. D. Law; tonnage, 1,499; New Orleans to Liverpool; cotton; abandoned at sea, March 22, 1880. Inquiry held at Liverpool, April 29, 1880, before Raffles, Stip. Mag.; Pickard, Wilson, and French, N.A. Casualty due to perils of the sea. Master justified in abandoning the vessel.

605. *Newbiggen*, s.s.; built at Sunderland, 1872; owned by Mr. G. R. Dawson and others; tonnage, 876; Odessa to Dunkirk; grain in bulk; stranded on Atherfield Point, Isle of Wight, April 3, 1880. Inquiry held at Newcastle, April 29, 1880, before Scott and Wilkinson, Justices; Forster and Beasley, N.A. Master in default for neglecting to verify his position by the use of the lead, or otherwise. Certificate suspended for nine months; recommended for one as mate during that time.

606. *Hawk*, schooner; built at Montrose, 1840; owned by Mr. W. Cargill and others; Dysart to Marans; coals; supposed to have foundered at sea. Inquiry held at Leith, May 1, 1880,

before Pentland and McIntosh, Judges; Vaux and Murdoch, N.A. No evidence to account for the disappearance of the vessel.

607. *The Craigs*, ship; built at Kennebank, U.S., 1861; owned by Messrs. R. and H. Cuthbert; Pensacola to United Kingdom; timber; abandoned at sea, February 22, 1880, but subsequently salved by a crew put on board from the s.s. *Teutonia* and taken safely to Queenstown. Inquiry held at Greenock, April 28, 1880, before Neill and Brymner, J.P.; Vaux and Murdoch, N.A. Abandonment not justifiable. Master's certificate suspended for six months.

610. *Northern Empire*, ship; built at Quebec, 1863; owned by Mr. J. R. de Wolf; tonnage, 1,379; New Orleans to United Kingdom; cotton; abandoned at sea, March 21, 1880. Inquiry held at Liverpool, May 1, 1880, before Raffles, Stip. Mag.; Pickard, Wilson, and French, N.A. Casualty due to perils of the sea. Master free from blame.

Official Inquiries Abroad.

566. *Margaret Craig*, barque; lost on Morguilla Point, January 20, 1880. Naval Court held at Valparaiso, February 11, 1880. Casualty due to careless navigation. Master's certificate suspended for twelve months, and mate's for six.

567. *Penguin*, s.s.; lost on Jibbel Zookur Island, November 20, 1879. Inquiry held at Aden, January 12, 1880. Accident caused by an error of judgment on part of the master. Reprimanded.

568. *Sarah Burnyeat*, barque; stranded at Lockeville, October 8, 1879. Inquiry held at Busselton, December 13, 1879. Master guilty of culpable negligence. Certificate cancelled.

570. *Southern Cross* and *Orphan Girl*; in collision in Darling Harbour, January 20, 1880. Inquiry held at Sydney, February 3, 1880. Master of *Orphan Girl* to blame. No certificate.

579. *Pioneer*, schooner; stranded in Freeman's Channel, Moreton Bay, December 25, 1879. Inquiry held at Brisbane, December 30, 1879. Pilot in charge to blame.

580. *Egmont*, s.s.; stranded on a reef off Hope Island,

anuary 22, 1880. Inquiry held at Brisbane, February 2, 1880. No blame attached to master.

586. *Charlie Palmer;* stranded at the entrance of the Moulmein River. Inquiry held at Moulmein. Master exonerated.

587. *Orontes*, barque, and *Eugene*, brig; in collision. Naval Court held at Hamburg, February 28, 1880. Collision caused by the *Eugene* not giving way in time. Master of *Orontes* guilty of not taking immediate steps to rescue the crew of the brig, and also of misconduct towards them. Certificate suspended for twelve months.

591. *Alarm*, schooner; stranded on a reef, February 22, 1880. Inquiry held at Leeward Islands. Casualty due to strong currents prevailing.

592. *Krishna*, s.s.; beached between Raree Point and Vingorla, May 23, 1879. Inquiry held at Bombay, December 23, 1879. Master justified in beaching the vessel.

596. *Ivanhoe*, ship; lost on the north coast of Tasmania, August 17, 1879. Inquiry held at Launceston, August 29, 1879. Master to blame for steering improper courses. Certificate cancelled.

597. *Hopewell*, barque; lost in a typhoon, near Cebu, Phillipine Islands, December 12, 1879. No blame attached to master.

599. *Dilharree*, barque; lost near the bar of the River Columbia, March 10, 1880. Naval Court held at Portland, Oregon, U.S.A., March 26, 1880. Loss due to the default of the pilot in charge.

H.M.S. "ATALANTA."

It has been decided by the Admiralty to appoint a Committee to inquire into the case of the *Atalanta*. The Committee will be instructed to report their opinion as to the stability, seaworthiness, and efficiency of the ship; also whether she was in all respects equipped and manned so as to fit her for the service on which she was employed. The Committee will consist of five members, of whom three will be naval officers and two civilians. The three naval officers will be Admiral Ryder, the Commander-in-Chief at Portsmouth, Vice-Admiral Randolph, and Staff-Captain Batt. The two other members will be Mr. H. C. Rothery, the Wreck Commissioner, and Mr. Waymouth, the Secretary of Lloyd's Register. The inquiry will be an open one, as in the case of a court-martial.

The following announcement has also been forwarded to us for publication :—

OFFICIAL NOTICE.

A REWARD OF £200

Will be given by the Admiralty to the first person who gives such information as may lead to any definite knowledge being obtained of the cause, or locality, of the loss of H.M.S. *Atalanta;* or who finds the first traces of any part of her hull or equipment.

ROBERT HALL.

ADMIRALTY, May 21, 1880.

THE

NAUTICAL MAGAZINE

FORTY-NINTH YEAR.

VOLUME XLIX.—No. VII.

JULY, 1880.

MERCANTILE MARINE LEGISLATION.

BAGS, CRIMPS, WAGES, PRISONS.

THERE are now before Parliament four Bills dealing with the Mercantile Marine. If the British ship-owner, the British ship, the British shipmaster, and the British seaman, are not the highest and best of their class in the world, it cannot be because they are subjects whose well-being is neglected. The theorist, the philanthropist, the official, the minister of state, the lawyer, the minister of religion, and the crimp, have, in various ways and at various times, taken special interest in (or against, as the case may be) the one or the other, or all.

At the present moment, however, the responsible ministry of the strongest of Governments of the time, have taken the matter seriously and earnestly in hand, and at last, we are glad to say, real business seems to be intended. No temporising this time, and no tinkering; but real good, honest, straightforward work that shall cure the evils.

Before we state what the real evils are, and before we refer to the suggested remedies, and point out how far they are genuine and sound, and how far they are unreal or useless and mischievous, we will enumerate the Bills now before the House:—

No. 1. Bill 119. "Merchant Seamen (Payment of Wages, &c.) Bill," prepared and brought in by Mr. Ashley and Mr. Chamberlain, present Parliamentary Secretary and President of the Board of Trade.

No. 2. Bill 151. "Merchant Seamen (Conditions of Service) Bill," prepared and brought in by Lord Sandon and Mr. Talbot, late President and Parliamentary Secretary of the Board of Trade.

No. 3. Bill 168. "Merchant Shipping (Grain Cargoes) Bill," prepared and brought in by Mr. Chas. Wilson, Mr. Anderson, Mr. Joseph Cowen, Mr. Gorst, Mr. MacIver, and Mr. Gourley. This is Mr. Plimsoll's Bill with new godfathers.

No. 4. Bill 205. "To Extend the Employers' and Workmen's Act, 1875, to Seamen whilst in British Waters," prepared and brought in by Mr. Burt, Mr. Joseph Cowen, Mr. Gourley, Mr. Gorst, and Mr. Macdonald. It means doing away with arrest without warrant, as well as with imprisonment for not joining or for desertion in the United Kingdom.

There are also sitting at the present moment two Select Committees—

1. To consider the whole subject of losses, and insurance.
2. As to fishing vessels' lights.

The Bill we have numbered 1 is the Bill of the present Board of Trade, and proposes as follows:—

Section 2. To abolish advance notes. This section as it stands will extend to British seamen everywhere, but there is a proposition to apply it only in the United Kingdom. If it should become law, which we trust it will, if limited to the United Kingdom, the day of the crimp is gone, excepting in so far as he will be at liberty to practise on foreign seamen. Allotment notes remain as they are, and as they are a great boon when limited as they are to the seamen's relatives named in the Merchant Shipping Act, 1854, it is to be hoped they will be more freely used than ever. There is, however, a very cunning proposal that needs careful watching on the part of the seamen's friends, to extend allotment notes to

other persons; in short, it would make the allotment notes worse evils than the advance notes, as they might secure to the allottee (who may be a crimp, or an unseaworthy female) not only one or two months' wages but half of the whole of the seaman's wages. As all the better class of shipowners, and the great body of respectable seamen and their families are in favour of the abolition of advance notes, and as their abolition was recommended by the Royal Commission, it is to be hoped that this really important clause will become law.

Clause 3 relates to the payment of seamen's wages, and makes legal provision for extending the "*Midge*" system, which has been so successful, and has called forth from the seamen so much approbation. That the "*Midge*" scheme is consistently opposed by crimps, by confirmed grumblers, and those who are interested in "boarding and lodging" seamen, is the very best tribute to its efficiency. Our readers will not forget the eulogiums passed by Lord Sandon on this scheme and on the permanent officers of the Board of Trade in connection with it. It is indeed a system of which Lord Norton may well be proud, as it took practical shape when he, as Sir Charles Adderley, was President. Under Clause 3 the Superintendent of a Mercantile Marine Office has powers of a magistrate to settle disputes up to £5.

Clause 4 is merely a strengthening of existing law as regards the powers of the police, and of other public officers, to check the manœuvres of crimps on board ships arriving after a long voyage when "Jack" has plenty of money either to fool away with the crimps' connections, or to send home to his wife and little ones, as he may be influenced at the critical moment of arrival.

Clause 5 is a rating clause, and provides that no man who is not already rated as A.B., or who has not served four years before the mast, shall be entitled to the rating of A.B. hereafter. It does not prevent masters from rating any man as A.B. who is competent—but it aims at preventing those loafers and jail birds often shipped as substitutes at the last moment from claiming wages and rating as A.B., if it is found when they get to work that they are "frauds." The good seaman hails this clause with

delight, and even wants to go further. We observe that Mr. Williamson, M.P. (brother of Mr. John Williamson, of Liverpool), has an amendment on the paper which will prevent the deep-sea fishermen from counting four years in fishing vessels as A.B.'s time for qualification; only three years of their term will suffice, and they must, if his amendment is accepted, go to sea for a year in a square-rigged ship—no matter how long they have been at sea in fishing craft. Whether this is a wise restriction of the labour market we doubt, as there are hundreds of steamers that carry no square sail to speak of, especially in the home and coasting trades.

Clause 6 provides that magistrates may cancel indentures of apprenticeship and articles of agreement, on such terms and conditions as are reasonable and necessary. This clause will be very useful in cases where it is clear that the parties had better be separated. It applies we imagine more particularly to fishing indentures.

Mr. Williamson has an additional clause on the paper, by which he proposes that local authorities should have power to license seamen's lodging houses—this clause is open to much misunderstanding that would be removed if the words were seamen's "boarding houses." The places sought to be licensed are more than mere lodging houses; they really are private hotels which have not spirit or beer licenses. We think that this clause is worthy of acceptance by the Government. If the local authorities do not put it into force it will be not for the want of power, but for want of interest in the welfare of the seamen and of boarding masters who are not crimps. The clause, if worked as is evidently intended, will be the means of marking out, and we honestly believe in extending the number of decent, comfortable, cosy houses, kept for Jack by old salts who have left the sea, and by those respectable seamen's widows who are now striving against all odds to win their way into Jack's notice, as against the crimp and brothel-keeper.

So much for the present Government Bill.

Lord Sandon's Bill, which we have called No. 2 in our list, seems to us to be an earlier edition of Mr. Chamberlain's and Mr. Ashley's Bill, but it contains Mr. Williamson's proposed

clause as to boarding masters, and it contains also a clause which does not abolish "arrest without warrant," but substitutes a penalty instead of imprisonment; that is to say, Jack would under it have the option of paying a fine, and would be sent to prison, not for his offence, but because he could not pay the fine. Misconduct, endangering life, limb, or ship, remains a misdemeanour. Whether this clause is likely to pass we cannot say; but it is at any rate an indication of the intention of the late Government in the matter.

As however the present Government have not included it in their Bill, they wish to put it off until a more convenient season and to deal with the subject of discipline as a whole. We can only trust they will do so early next session.

The above two Bills are intended to deal with two evils, viz., (1) the crimp; and (2) the delay now too often incurred in paying Jack's wages at the end of the voyage. The funds come from the pocket of Jack himself, who pays his engagement and discharge fees. In principle, therefore, the Bill is right. Jack pays for what is done for him.

The third Bill in our list, which is known as the Bagging Bill, is referred to the Select Committee, No. 1, to which we have already referred. This is the Bill that entered largely into Mr. Plimsoll's consideration when he made way for Sir William Vernon Harcourt, at least that is what we gather from Mr. Plimsoll's celebrated speech and the devout and now immortalized dialogue with "Eliza." We gather from Mr. Plimsoll's evidence given before the Select Committee, that he is not averse to amendments being made in his Bill. This is fortunate, for what it means as it stands, and what it would effect, is not easy to discover. As far as we can make it out it will, when put straight, mean this:—

1. The Board of Trade are to approve or to decline to approve of regulations and systems of inspections made and established in foreign ports of loading.
2. If the regulations and system of inspections are approved of by the Board of Trade, then British ships may carry grain as more than a third of their cargo without let or hindrance from that foreign port to another foreign port,

and foreign ships, as well as British ships, may bring it to the United Kingdom.

3. If the foreign regulations and inspections are not approved by the Board of Trade, then no British ship may carry grain as more than a third of her cargo from the foreign port to another foreign port, and no ship, British or foreign, may bring it from that foreign port to the United Kingdom, unless (*a*) all the grain carried is carried in bags, or sacks, or barrels; or unless (*b*) the ship is certified by the Board of Trade as specially built or fitted to carry grain in bulk with safety.

What is to happen in the case of British ships registered in a colony is not clear, except that the Board of Trade cannot possibly give them a certificate. If foreign ships are to bring grain between foreign ports without complying with the regulations applicable to British ships, the owners of British ships must register under a foreign flag, which they can do for a small sum.

We cannot say, however, whether the Bill gives the Board of Trade certificate priority, or whether the Bill means that if there is a system of regulation and inspection approved by the Board of Trade, then there is to be an end of the matter. We trust that this is what is meant as it will much simplify matters, and will be satisfactory to Mr. Plimsoll and to the shipowners. It really is their way out of the difficulty, if two more provisions are added in the interests of fair play (which is a jewel in these matters), and they are — (1) that the regulations and inspection are *bonâ fide*, are strictly enforced, and are not to be evaded by a fine, and rejected at will as now; and (2) that the Board of Trade are satisfied that they are applied to Foreign, Native, and British ships, all alike. Let these conditions be clear, and we find no fault with that provision in the Bill. It is good, and it is needed. We register these as our own suggestions which, however, Mr. Plimsoll has the fullest liberty to advocate and carry through: without them his clause will be unjust and very imperfect. We of course assume that some clause will be put into the Bill showing how the approval of Her Majesty's Government is to be expressed for the purposes of

the Bill, and how it is to be made valid, and what it is to mean. But our too sanguine friends must not think that the Board of Trade would for ever find it easy or even possible to withhold their "approval" of arrangements if somewhat imperfect. In the first place the food supply would have to be considered, in the second place the trade would have to be borne in mind, and in the third place, even though the present President and Home Secretary may be as firm as adamant in withholding approval of anything incomplete, such may some day hereafter be the altered political necessities of the situation, that the shipowners' views may be paramount. Experience has everywhere shown us that if a trading interest keeps pegging away long enough, that interest gets its own way in the end from one side or the other.

Sufficient for the day is the work thereof. Supposing Mr. Plimsoll's clause passes, everybody interested in ships and grain to be carried in ships, will soon be straining every nerve to get regulations and inspection established and approved at foreign loading ports, and the authorities at most of those ports will, we think, also be ready to fall in with Mr. Plimsoll's views, as the ship must pay for it all. Our experience leads us to believe that when a local Port Authority sees its way to maintain a staff at the cost of ships, chiefly foreigners, it is always ready and willing to do so; moreover, it would be highly wrong for the taxpayer of the loading country to be called on to pay for maintaining "an army of surveyors" to see that ships of other countries are loaded properly. It would be simply absurd! Why should the electors of our own country pay to see that foreign ships are safe when they take our iron to a foreign country? And why therefore should the "toiling millions" of Russia, or of the United States, spend their hard-earned money in paying surveyors to see that the ships of "the Britisher" are safe when they try to take away from those countries the produce of their soil. It is clear that the ship should pay for the inspection and for the regulations.

It is by no means at all necessary that regulations for loading and freeboard in the United Kingdom should be undertaken by the Board of Trade. If the underwriters combine and do in all the ports of the United Kingdom what they do in New York, and

if the Board of Trade signifies its approval of their rules and practice, then it is clear that the Board of Trade need only interfere with ships not loaded under the underwriters' rules and practice. We think indeed that if a statute were framed placing the duty on the underwriters' societies, or on a caucus made up of delegates from underwriters', shipowners', and registration societies, with a power in the Board of Trade to signify or withhold approval, the matter would be very simple. And a step would be taken which has long been needed of placing the doings of those societies under review of a responsible Government department. It is not creditable that one of the chief registration societies should give the highest class possible to ships, which the chief technical officer of that society afterwards finds it his duty to explain must inevitably turn over if she is loaded with coals or grain to the depth at which she is expressly constructed and intended to be loaded.

Of course if the interests we have named fail to do what is necessary, then power should be left with the Board of Trade to step in and do it for them.

But, in the end, if the local regulations and inspections are not made, the British shipowner can, under the Bill, fall back on bags —(which, by the bye, will increase the danger unless shifting is otherwise provided against, and unless overloading is checked)— or he can fall back on the Board of Trade certificate and absolve himself. We deny utterly the idea that "bags" will cure or even touch the evil, but the Government certificate may mean obstruction to the latest degree. As things to drive people away from them, and into the safe refuge of regulation and inspection at the loading ports, and (we now speak in the interest of the shipowners) freedom from responsibility afterwards, we think they both deserve attention. Overloading is the evil, and proper loading is the remedy. Local regulations at loading ports strictly enforced, and not "bags" will cure it. We always sympathise with Mr. Plimsoll up to a certain point; it is when he begins to abuse people indiscriminately and gratuitously, as in the case of the *Homer;* and when he proposes a nostrum to cure evils that it cannot touch, we disagree with him. Let him throw over

abuse; and divest himself of new nostrums and his "bags," as he has done of his former nostrum, compulsory classification; and he will find that we do not disagree very much as to the end to be attained. It is "means," not "ends," on which we have always differed.

This Bill is wholly and solely in the interest of the bodily safety of the seamen, and in no other interest whatever.

We have abstained in this article from discussing the principle adopted by Mr. Plimsoll and Mr. Mac Iver in framing this Bill; but we may mention that the principle is that labour unless aided by the State, is totally unable to make fair terms with capital; that freedom of contract is all very well in theory, but is antiquated and useless as an every day practice. Mr. Plimsoll and Mr. Mac Iver think that in the sacred interests of labour, which of course include the physical well-being of the labourer, the State should put the capitalist into a straight-jacket, and both capitalist and labourer into leading strings, for the doing of which the employer or the general body of taxpayers should pay. We are not now saying that this is wrong, we are merely stating a principle.

In the present case the undoubted facts are that some, but very few, shipowners have ignorantly, heedlessly, or knowingly risked, if they have not wantonly and knowingly sacrificed, the life of the sailor for gain—and in the face of Statutes have not been held responsible criminally. We trust that no shipowner will dispute these two facts. The deduction drawn by Mr. Plimsoll and Mr. Mac Iver from those facts is that State interference should ensue. They have not, however, yet shown that State interference will cure the evils. Their syllogism is as yet imperfect. Be that as it may, if they have not logic on their side when they draw their inference, they have the feeling of the country and of the House of Commons with them, which for their purpose is of more value than logic; and even lookers-on, like ourselves, say that something must be done.

Without pursuing the above discussion further, we should like to say a word as to compensation. The State now compensates shipowners, if the State in the exercise of its duties makes a

mistake. We think this a most unwarrantable thing in principle and a dangerous precedent to continue; but if the State pays a shipowner for improperly delaying a ship, surely the State should compensate the families of seamen if they allow dangerous ships to take "the bread-winners" to sea and lose them there. The principle we think is wrong; the State should not compensate either, any more than it compensates persons wrongfully taken into custody or persons acquitted on trial; but so long as the State compensates the capitalist for a wrongful detention of an inanimate ship, so much the more ought it to compensate the families of the labouring "bread-winner," if by neglect or oversight of the State officials his life is lost in a ship that ought to have been detained.

As regards the fourth Bill on our list we cannot now discuss it; we are glad it is, in the interests of Mercantile Jack, postponed to an early convenient moment. It can well come on at the same time as the "cat" question, which affects Tommy Atkins and Ben Bolt on the same principle, though in a somewhat different manner. What is to be substituted for the present practice? is the answer to be found in both cases.

THE ROYAL NAVY AND THE MERCANTILE MARINE.

THE vast proportions of the British shipping trade constitute one of the most remarkable commercial features of the age. Year by year the statistics of our Mercantile Marine show an increase which yields no sign of having nearly reached the limit of expansion. When the number of vessels is not augmented there is still a considerable addition to the total tonnage. Even the late severe and wide-spread depression, which so sharply checked the progress of most industrial undertakings, seemed powerless to arrest the advance of the gigantic ocean carrying trade of this country. No doubt it curtailed the returns, and prevented what might have been regarded as the normal extension of the shipping business in general; but it seemed, for that particular branch of British industry at

least, to be not without its beneficent side. For whilst the foreign tonnage entered and cleared at ports of the United Kingdom has annually diminished since 1876, the British has never ceased to increase. The position thus gained by our shipowners it will be difficult to take from them again. The aspect of our ocean trade at the present day illustrates very clearly the remarkable economic condition of the country. An enormous exchange of commodities with other nations has become now not more distinctly a source of wealth to us than a necessity of existence. It is now one of the common-places of public writing and public speaking, that we are becoming more and more dependent upon distant regions for our needful food. The legislation of 1846 is at length approaching its logical and inevitable development. The policy then adopted has become that of the whole country; and there can scarcely be any dispute that we must provide, and without delay, for its full completion. We have now arrived at a state of things in which the security of our sea-borne trade means the security of the Empire. Protection for our commerce in war is therefore the indispensable implement of the economic policy which enables us to draw our supplies from every quarter of the globe. The delicacy of the position in which we might be placed by some international complication, now that we have to look for nearly, if not quite half our food from abroad, is heightened by the fact that we have so large a share of the whole carrying power of the world. Were our merchant shipping to disappear from before some new *Alabama*, the united efforts of the maritime powers would not suffice to fill the void so created.

That there is nothing unreasonable in desiring that our shipping should be able to count upon adequate protection in time of strife is shown by many things. Not the least significant one is the efforts which are being made to add to more than one foreign Navy those swift cruisers of the new type, the only object of the existence of which is the preying on an enemy's commerce. There need be no question as to the amicable state of our relations with each and all of our neighbours. The new cruisers are being built, or even only designed for future, rather than for present use. And if the misfortune of a quarrel with us should intervene, there

are the means of annoyance at hand. In order to guard our shipping trade efficiently we should be prepared to extend to it an almost ubiquitous defence. Every ocean and sea is now scored by the lines which indicate trade routes, in every one of which we have a considerable interest either as merchants or as carriers. And not the connecting lines alone, but in these days of steam navigation to all parts, the coaling stations as well require to be secured against attack. Where the object to be protected is so vast as our enormous Mercantile Marine, and so widely scattered, it is obvious that no war Navy could be maintained at all times on a footing anything like adequate to the proper performance of the duty. The scale of our establishments, if raised so as to be able to answer all calls made upon them, might well appal the most exacting advocate of protection for our maritime commerce. Reserves are indispensably necessary. For several years the propriety of making provision for keeping up a reserve of seamen has been recognised; and a very admirable body of men belonging to the merchant service has been brought into communication, more or less close, with the Royal Navy; to the advantage, it may well be believed, of both. More recently the necessity of providing a reserve of ships has been acknowledged, and whatever may be thought of the methods pursued to secure it, few will doubt that the recognition of the principle of its necessity is, of itself, distinctly conducive to the welfare of the country. It may very safely be asserted that the efficiency of any reserve increases in the direct proportion of the familiarity which those who may have to depend on its support, have with its condition and details. If it be altogether or nearly strange to them, it will be regarded as an ally rather than as a reinforcing reserve; a stranger to be polite and grateful to, but watchful and jealous of. There are grounds for apprehending that the merchant service is less and less regarded as the natural reserve of the Navy. However few symptoms of this we may see in the policy adopted by the authorities, it is to be feared that there are only too many to be observed in what may be called the public opinion of the Royal Service. There is, of course, no openly expressed, perhaps no distinctly felt desire to dispense with the aid of the Mercantile Marine in those times of

difficulty and danger when every good citizen would offer his services to his country; but there is a lack of instinctive feeling that to it the Navy must turn when really in want of support. The gulf between the two services, in one essential particular practically the same profession, has been for many years continuously widening. This is easily explained. The strictly naval profession has become more and more specialised. The marvellous ingenuity which, in our age, has been devoted to perfecting the methods and materials of maritime warfare has rendered necessary a course of instruction of a rigorously technical character. The success attending the modern system of training lads for the sea-service of the Crown has quelled all the apprehensions formerly felt as to the manning of the Navy. Recruits are now very rarely either received or asked for from merchant ships. The components of our fleets are everyday becoming less and less like the vessels in which so vast a portion of the commerce of the world is carried on. The result, however perceptible the cause, is unfortunate. The security of our immense interests on the sea imperatively demands that the alliance between the two services should be closer.

No such alliance could be at all satisfactory which failed to give due allowance to the just claims, even to the natural susceptibilities of both. No doubt it will be a nice operation to arrange it so as to give no cause of complaint to either. But the first thing wanted is an admission of the necessity of bringing about the alliance. When that is generally made the details of the compact may be looked upon as being in a fair way of being settled. The seafaring profession may be now taken as divided into two great divisions, the sailors and engineers. Both are found in each of the two services, and the first qualification of both—that they be in the one case good seamen, and in the other good engineers—is as necessary in the one as in the other. The accession to the ranks of the Navy of a large number of such in time of threatening or actual war has already, and at no distant date, proved most acceptable. It is highly desirable that the way should be thrown open to such as wish to join it for the future. It is by no means absolutely necessary that a lifetime should be spent on board ships

of war to enable an officer to become a very welcome addition to the Navy when the calling out of the reserves may be requisite. A few years in early life so spent should eminently fit him for a position of importance in the ranks of the reserve at a subsequent day. There certainly is not now, if indeed there ever was, any obstacle to be found in what may be designated the social aspect of the question. The two divisions of the profession, in both services, are largely recruited from exactly similar ranks of society; and an officer or engineer passing from either one to the other would find himself certainly amongst equals, and probably amongst relatives and friends. Constituted as society is in England, this is a point which must not be lost sight of; and, whatever opinion we may have of those who would avail themselves of it to throw difficulties in the way of an alliance between the services, we cannot but be grateful that there is so little likelihood of any obstacle arising on that score. The maritime defence of the Empire will never rest on a secure basis till the skill and devotion of all our seamen are made properly available.

UNSEAWORTHY STEAMERS.

IN a former number we placed before our readers an abstract of an interesting and able paper by Mr. Martell upon the recent losses of steamers, and of the discussion thereupon at the meeting of the Institution of Naval Architects. After dealing with a large number of possible causes of loss, Mr. Martell arrived at the conclusion that deficient stability is at the root of the evil, that the type of vessel which is worst in this respect is induced by the defective tonnage laws, and that, therefore, the tonnage laws should be speedily amended so as to lead to the building of a better class of vessels. Lloyd's Registry is a body whose business it is to furnish information about ships to underwriters. The information they have furnished about certain ships is that they are fit to carry dry and perishable cargoes to all parts of the world, that they are the very highest standard of efficiency, and so are marked 100 A 1,

but the Chief Surveyor to the Registry says of the same ships that they are, under the ordinary conditions of loading, unsafe. The class of steamer of which this is said is that usually known as the "three-deck ship," built to carry a large amount of cargo as compared with the principal dimensions, and consequently with the cost price of the ship. In the three-deck steamer, the arrangement of the material is that which gives the greatest strength for the weight. The evil appears to be that the vessels possess so much strength that in order to get out of them their full carrying capacity in proportion thereto, they have been loaded very deep and have had so little freeboard that the reserve of stability at moderate angles of inclination is dangerously small. The initial stability is mostly as large as in the case of spar and awning-decked vessels, but there being so little freeboard, the result is that at a quite moderate angle of heel, the edge of the deck comes under water, soon after which the stability rapidly decreases and finally vanishes at an angle of about 40 degrees. The characteristics of this class of vessels are large depth in proportion to breadth, and very full lines; in fact they are spoken of contemptuously as "prisms," or "parallelopipedons." The depth is in most of them as much as seven-tenths of the breadth. Mr. Martell lays some stress upon this point, but does not rest entirely upon it, and in fact mere proportion of depth to breadth does not tell us much about a vessel. In spar-deck ships, the proportion of depth to breadth is usually larger, that is, if the depth be measured to the spar-deck; but then spar-deck vessels are not loaded so deeply as three-deck vessels, and in this last point is included much of the question. Freeboard must, we think, be considered chiefly in regard to three considerations:—

1. Height of platform with a view to proper security of openings in the deck, and possibility of properly working the ship.
2. Stability at probable angles of inclination.
3. Strength of structure.

The three-deck steamer is amply provided for as regards the last point. There is no question as to her strength, while on the other hand the spar-deck steamer would not be strong enough to be loaded deeper than is the usual practice with that class of vessel.

It is, however, said with much truth, that three-deck steamers are frequently loaded so deeply that when they have light homogeneous cargoes, or rather homogeneous cargoes of such specific gravity that the ship can be nearly filled up with them, the stability vanishes at angles to which the ship may possibly be inclined. Mr. Martell gives the result of calculations on one ship, 245 length × 33·3 breadth × 23 deep, having a freeboard of 4ft.; her maximum stability is attained at 25 degrees inclination, the stability vanishing at 50 degrees. Increasing the breadth 2ft., other things being the same, the maximum is still reached at 25 degrees, but of course is much greater in amount; the stability vanishes at about 55 degrees. If, however, the original vessel had 5 feet freeboard instead of 4 feet, the maximum stability would not be reached till she was heeled over 40 degrees, and the stability would not vanish short of 80 degrees. This surely does not go to prove that the vessels are unsafe merely because of improper proportions, but for the very simple reason that they are overladen. The plain inference from the figures is that a few *inches* more freeboard is of nearly as much consequence as a few *feet* more beam.

To cure these evils, which, as we have seen, are due purely and simply to overloading, Mr. Martell wishes to revolutionize the tonnage laws. He proposes that when a ship has a spar-deck, awning-deck, bridge-house, or other deck erection, since this ordinarily would not be occupied with cargo, it should be exempted from measurement, except when so occupied, or a certain allowance should be made in respect of it. Numerous difficulties of detail at once suggest themselves, such as how should the terms spar-deck, awning-deck, &c., be defined with the necessary exactness, for we presume a different percentage allowance would be required in each case. Of course Lloyd's rules define them, but then all ships are not built to Lloyd's rules, and we have to consider possible additions to and alterations of superstructures, besides claims to allowance in existing ships which would certainly be made in large numbers on grounds of various peculiarities of construction, said to prevent their being fully laden. Difficulties this kind might perhaps be got over, but the proposal instead

of merely amending would altogether upset the present tonnage laws. The law aims at assessing ships in relation to their capabilities of earning freight. Mr. Martell's proposal is based upon the assumption that freight is earned in proportion to space occupied with cargo. This, however, is by no means the case. On the one hand, vessels carrying heavy cargoes have but a very small space really occupied by cargo; but, notwithstanding this, use covered-in space to furnish the necessary buoyancy and spare buoyancy for the safe carriage of the cargo. On the other hand, there is the case of passenger steamers, which, besides the space necessary for the accommodation of the passengers, have large portions of spar or awning-deck space, useless, except to give the vessel the large freeboard necessary to the comfort and safety of passengers. The tonnage law defines space liable to measurement to be "closed-in space available for cargo or stores, or for the accommodation of passengers or crew," the places actually occupied by the crew being made the subject of a special allowance under certain conditions. It is of course difficult to define freight-earning capacity. To assess vessels on the dead-weight of their cargo would be manifestly unfair, because passenger steamers which make large earnings would have a very small assessment. The tonnage laws it may be said are a compromise, between a dead-weight tonnage on the one hand, and a measurement of space actually occupied on the other. We think it would be difficult to hit a fairer compromise than is obtained by measuring "space *available*." Mr. Martell's reason would be, however, altogether inadequate even if it were just. Because a few dozen steamers have been in the habit of loading deeper than they should considering certain defects in them, perhaps known to their owners, certainly known to Lloyd's Registry, the existing tonnage laws are to be disturbed in order that shipowners and shipbuilders may be bribed, with a view to the production of better and safer ships in the future. Far easier would it be for Lloyd's to put a mark opposite each such ship in the register book, so that underwriters and all concerned may know that she would be especially unsafe if deeply laden.

We should think thus even if we believed that an alteration of

the English tonnage laws would influence the question. We do not see that it would in the slightest degree effect that purpose. Charges levied upon English tonnage are but little trifles compared with Suez Canal tonnage dues, and the latter being the result of complex international arrangements could not be altered even to help Lloyd's Registry in its praiseworthy business of furnishing information to underwriters and shipowners. As regards gross tonnage, the Suez Canal assessment like the English is based upon "space available." The "parallelopipedon" ship, has, we believe, come into existence as a direct consequence of the Suez Canal. It is specially fitted for the Canal trade, that is, for a long voyage in comparatively smooth seas where high speed is not required. The first few days out are the great risk in that trade, and are the cause of much mischief; but most of the recent losses of steamers have occurred in the Atlantic trade for which the "parallelopipedon" is altogether unsuitable. The Suez Canal, however, brought the type into existence, and no alteration in English tonnage only will much affect the question.

We must further remember that English gross tonnage is now international tonnage. English ships are thus saved much trouble and delay in foreign ports. This arrangement has practically stereotyped the tonnage rules. The difficulties in the way of modification of them increase as the rules become more universal. It is unnecessary for us to say much upon the further considerations of the unfairness of allowances to certain kinds of ships on the ground of additional burdens being thrown upon all others. Conclusively, steam shipowners cannot be bribed to make their ships safe at the expense of dock companies and sailing ships.

Our remarks upon tonnage are, we must add, confined to the law for measuring *gross* register tonnage, which alone is international. The allowances for engine-room, &c., in English tonnage, are utterly irrational and absurd, and most foreign countries which use our rule of gross tonnage do not use our rule for engine-room allowances. This, however, does not affect the present question, and we should not mention it, but that part of what is justly said about the absurd rules for engine-room allowance is frequently unjustly and unfairly fastened upon the really good and sensible gross tonnage rules.

As regards the causes of losses of steamers, we think that both Mr. Martell's paper and the discussion ran too much in the groove of danger due to instability attributable to form and, as we have said, to excessive depth. Granted that some vessels have been lost because they were so overladen as to be deficient in stability when inclined at moderate angles. Is not such instability partly due to other causes than excessive depth, and water-ballast tanks? One objectionable feature of the missing steamers is, we will not say caused but certainly encouraged by Lloyd's rules. This is fulness of form, conducing to defective stability and also to unhandiness at sea. The scantlings of ships built under Lloyd's rules depend upon the length of the vessel and the perimeter of her half midship section, consequently two ships with the same midship section and the same length must have the same thickness of plating, &c., although one may be of much fuller lines than the other and consequently carry a very much larger cargo. This certainly tends to encourage the building of full ships. Gross register tonnage is, we submit, a much fairer measurement of a ship for *its* intended purpose, than Lloyd's numerals are for *theirs*.

We have said nothing yet of the importance of height of platform in ensuring the safety of ships, both as regards the handling of the vessel and the security of the deck-openings. We agree with Mr. Martell that the latter point is at present not properly attended to, and are disposed to attach very much more importance to it than even he does. In a recent article in this Magazine, we referred to the imperfect provision for the delivery of water in steamers with high bulwarks. In many cases the sheer strake is 18 inches above the deck, and up to this height water is only delivered by a few scuppers, while above it the delivery ports are often small and badly constructed. Obviously the dangers caused by imperfect covering of deck-openings come into full play when in heavy weather there are large masses of water almost constantly on the deck.

We are glad to be at one with Mr. Martell in his views on the stowage of grain-cargoes. We should think the proposal to prohibit the carriage of grain in bulk will hardly be proceeded with, in face of the fact that at the Institution of Naval Architects in a

discussion upon the recent losses of steamers, the general consensus of opinion was that grain can be safely loaded in bulk. Mr. Martell suggested several ways of dealing with the several types of ships. We believe there are better ways than any stated by him; but after all, the important point is not so much the special kind of precaution, as the faithful carrying out of its details. It is notorious that so-called grain-tight shifting boards are scarcely ever grain-tight. We think the remedy is in the hands of the shipmaster himself. He should know as much about it as any surveyor, and he ought to take pains and care over what is essential to the safety of himself and of those committed to his charge.

THE CORAL FISHERIES OF THE MEDITERRANEAN.

THE coral used in jewellery, and known as precious coral (*corallium rubrum*), is obtained in the greatest abundance in the Mediterranean, although its existence is unequally distributed. In the Ægean it occurs sparingly, and only as small specimens. The coasts where this precious zoophyte is found in the greatest abundance are those of Corsica, Sardinia, Provence, Africa, the vicinage of Trapani, and the Straits of Messina. These localities produce different colours: the Barbary coast furnishes the red, dark red; Sardinia the yellow or salmon colour; and the coast of Italy the rose-pink. In Europe and America the latter is most valued, while in the East the dark red is preferred. It is also sometimes obtained of a milk-white colour. The Spaniards and the French have been engaged in the coral fisheries, but their ships have not equalled in number those of the Italians. From the middle ages downwards the securing of the right to the coral fisheries on the African coasts was an object of considerable rivalry among the Mediterranean communities of Europe. For a short period the Tunisian fisheries were secured by Charles V. to Spain, but the monopoly soon fell into the hands of the French authorities. Previously to the French Revolution, much of the coral trade centred in Marseilles, but since that

period both the procuring of the raw material and the working it up into the various forms in which it is used, have become peculiarly Italian industries, carried on largely at Naples, Leghorn, and Genoa.

The coral is attached to the submarine rocks, as a tree is, by the roots; but the branches instead of growing upwards, shoot downwards to the bottom of the sea, a conformation favourable to breaking them off and bringing them up. The coral branches require about twelve years to attain the length of ten or twelve inches, and the thickness requisite to fit them for cutting into beads for necklaces or other ornaments. On this account, in prosecuting the coral fishery, the fishermen endeavour not to disturb the same ground for that period of time. Torre del Greco, near Naples, is the residence of many of the coral fishers, and the place from which boats are fitted out for the business. The coral obtained by them is sold to the merchants, who have it manufactured into various articles of ornament for the European market. The number of Italian barques employed is between 300 and 400, and the number of sailors engaged is between 3,000 and 4,000. Two classes of boats engage in the pursuit—a large size, from 12 to 14 tons, manned by ten or twelve hands; and a small size, of 3 or 4 tons, with a crew of five or six. The larger boats, dredging from March to October, collect from 650 to 680 lbs. of coral, and the small, working throughout the year, collect from 390 to 500 lbs. The Algerian reefs are divided into ten portions, of which only one is fished annually, ten years being there considered sufficient for the proper growth of the coral. The depth at which it is found is very various; all that appears important is that the coral insects should always be below low watermark, and that the rays of the sun should not readily penetrate. The beds are generally two to ten miles from the land, and in water of about 30 to 130 fathoms deep; but it finds its most favourable conditions in 80 fathoms water. It is found attached to rocks embedded in a muddy sea bottom, in which it flourishes more than in a clear or sandy bed.

In the Straits of Messina, the rocks upon which coral grows are situated almost in the middle of the strait, at different depths from

350 to 650 feet. The bottom and caverns of the rocks are the places from which they endeavour to bring up the coral with their nets. The greatest height to which the coral grows is never a foot, and its usual thickness is that of the little finger, and somewhat less than that on the coasts of Trapani and Barbary; but the latter is exceeded by the Messinese in vividness of colour. These differences, in the belief of the fishermen, arise from the coral being produced in a sea which is kept in continual agitation, from the surface to the bottom, by the current and the winds.

The method of fishing is nearly the same in all places. Seven or eight men go in a boat, commanded by a patron or proprietor; the caster throws his net, if we may so call the machine wherewith he tears up the coral from the bottom of the sea, and the other six manage the boat. The net is composed of two beams tied across. with a leaden weight to press them down; to the beams is fastened a great quantity of hemp, loosely twisted round, among which they mix some strong nets. In this condition the machine is let down into the sea, and when the coral is pretty strongly embarrassed in the hemp and the nets, they draw it up by a rope, which they unwind according to the depth, and which sometimes requires half-a-dozen boats to draw. If the rope happens to break, the fishermen are in great danger of drowning. They have two machines, one for fishing up the coral when the bottom is smooth, and the other, called the *salabre*, so constructed as to be employed where the bottom of the sea is rock and unequal. Before the fishermen go out they agree on the price of the coral, and when the fishing is over it is divided into thirteen parts; the patron whereof, or master coraller, has four, the caster two, and each of the six companions one, the thirteenth being reserved for the company for payment of boat hire, &c.

Upon the coast of Barbary the coral fishery takes place at two seasons of the year, in winter and summer. The summer fishing commences in April, and finishes with the month of September; that of the winter takes place in the other six months. In the first days in the month of March every year the vessels intended for this fishery prepare to depart from the different ports of Italy for the coast of Africa; the master-fishermen form their crews

from the seafaring people who have no other occupation, and who are therefore contented with a small remuneration. The vessels that go to Africa in attendance upon the coral fishers, carrying with them the implements and the provisions of which they stand in need during the whole of the season, give at the time of their departure an appearance of animation at the ports to which they belong. Towards the end of March, the vessels approach the coasts of Africa, and pay the taxes to the Government, and deposit on the shore all their provisions, departing in the first days of April for the fishery, carrying only the fishing gear and provisions for a few days. Having arrived at spots, five or six, sometimes ten miles distant from the coast, where it is believed that coral banks exist, they slacken speed and cast their nets into the sea. These remain attached to the vessel by means of a rope, and being towed swiftly, any resistance probably indicates that a bank of coral has been encountered. A long run is often made before this happens. When the net contains coral, this is separated from the pieces of rock and various matters adhering to it; it is placed by the patron in a strong box. The fishery continues so long as the state of the sea permits, or until the failure of provisions or some needed repairs compels the ship to return to port. During the fishery the life of the coral fisherman is one of constant exposure to danger and extreme hardship. Eager to continue his operations to the utmost limit of time for which the duty has been paid, he is often tempted to remain at sea during very tempestuous weather, and he does not enjoy a moment of repose either day or night, whilst his food is chiefly composed of water and biscuit. Among the principal reasons for the decline in the number of the French fishermen engaged in this industry, is the reduced quantities obtained from the coral beds which begin to suffer from exhaustion. The Italians and especially the Neapolitans owe their superiority to the extreme sobriety of their lives, not less than to the smaller expense incurred for the purchase and rigging of their vessels and for the pay of the sailors.

The coral carried to Italy is sold in the markets of Genoa, Leghorn, and Naples, where it receives its first polish and undergoes its successive manipulations. The price of the raw

coral varies according to the size of the pieces. In Leghorn there are several manufactories for working in coral; each of these establishments employing from 250 to 300 workmen; this branch of industry thus giving occupation to a thousand women. The greater part is sent to the East Indies by way of Marseilles; a large portion is exported to Germany, especially for necklaces of an inferior quality, destined to serve as funeral ornaments. It is also sent into Russia, where this article is in great demand. The quantity of coral brought yearly to Genoa is estimated to be in value nearly half a million sterling. The sellers of coral are chiefly to be found in the Strada Degli Orefici, or Jewellers Street, which is bright with the shops of coral, and silver and gold filagree work, the latter mostly in the form of butterflies, flowers, or feathers.

The greater part of the coral is wrought into beads; this work, which consists of three different operations, cutting, piercing, and rounding, is executed by the country people, and principally by the women of the Val de Bisagno. The manner in which it is distributed among the inhabitants of the different communes of the valley affords a fine example of the principle of division of labour. All the workmen employed in cutting belong to about one hundred families in the *commune* of Assio. Those in piercing and rounding to about sixty families living in other parts of the valley. Each village works exclusively at beads of a fixed size. The inhabitants go to Genoa to procure the raw material from the coral sellers, and to take back the coral which they have wrought. In Genoa, each manufacturer employs from ten to twenty women or more, who submit the coral to a preparatory process before it is given to the workers of Bisagno. Upwards of thirty men or women are employed in their own homes in cutting coral with facets. There are perhaps thirty engravers of cameos on coral. Without exaggeration it may be affirmed that from 5,000 to 6,000 persons in the province of Genoa gain their living either by fishing, working, or selling coral. In addition to the considerable sales by retailers to the strangers who visit the far-famed city of palaces, the Genoese export their coral ornaments to Austria, Hungary, Poland, England, Aleppo, Madras, and Calcutta.

A recent letter from Rome announces that an extensive coral bank has been lately discovered about ten miles south from Sciarra, on the Neapolitan coast. Judging from the quantity and quality of the material already fished up, this new bank seems to be richer and more important than the one discovered about five years ago not far from the same spot. The new Italian fisheries law secures to the discoverer of a coral bank for two years the exclusive right of fishing upon it. But this enactment has not yet come into operation, and several fishing vessels from Torre del Greco have already flocked to the scene in the hope of making a rich harvest. A similar fate has happened to a coral bank discovered last April in the waters of Porto-Ferrajo.

SOUTH AUSTRALIA.

THE following extracts from the Annual Report (1879) of the President of the Marine Board of South Australia, will no doubt prove interesting and serviceable to many of our readers :—

"INNER HARBOUR, PORT ADELAIDE.—There is a very large amount of deepening necessary in the Inner Harbour between Jervois Bridge and the Outer Bar (a distance of about nine miles) before ships can come to the wharves at low water. No ship with a draught exceeding fourteen feet can possibly do so at present on account of the obstructions at the Inner Bar and that portion of the creek north of Levi's Wharf towards the North Arm. The dredgers *Willunga* and *Wallaroo* are, however, rapidly clearing away the last-named section, and, possibly, six months hence a good channel may be excavated in this direction, which will enable outward-bound ships to leave much earlier on the tide, and thus get over the Inner Bar before the ebb tide makes.

"On the 1st March, 1880, the Marine Board took charge of the twelve gas beacons which have been erected at salient points in the river for the benefit of masters of ships wishing to navigate during the night.

"Six sets of new screw moorings have been placed in position for the benefit of vessels laid up or awaiting charters.

"It is somewhat significant that there are numerous berths unoccupied at this the busiest season of the year, which will, no doubt, be accounted for by the inauguration of weekly steam communication direct with Great Britain, and, principally, by the large shipments which have been made from the outports.

"Outer and Inner Bars.—The Outer Bar, in mid-channel, has now a depth of eighteen feet six inches at low water springs. This is so far satisfactory, but until the Inner Bar is cleared away there will not, for any practical purpose, be a greater depth of water in the river than there was five years ago.

"Immediately the dredgers have finished the section at which they are now working, they should commence operations at the Inner Bar, one at each end, and excavations should be vigorously carried out until a depth of at least eighteen feet at low water is obtained for a width of not less than 200 feet. When this depth is arrived at the cutting should be widened to at least 300 feet, which is absolutely necessary for perfectly easy and safe navigation.

"During the year the Engineer of Harbours and Jetties pointed out that the sandbank on the north side of channel at the Outer Bar had made a considerable encroachment on the excavated channel, and suggested, as a remedy, filling up the boat channel and forming a retaining wall with the stones raised from the Inner Bar. The Marine Board has long been of opinion that a retaining wall to the Outer Bar, from Torrens Island on the one side, and from Snapper Point on the other, will be the only effectual means of keeping the Outer Bar clear. By confining the channel in the manner indicated, not only will nature assist in scouring the channel, but a large area of reclaimed ground will be obtained on the east side of the channel by filling it up with the river excavations.

"Outports.—I am surprised that some of the enterprising shipowners in England have not thought it worth their while to run steamers of large tonnage to Germein Bay to convey the grain rops from the Areas around Port Pirie. Possibly the question not been considered; but I feel convinced that such means of

transit will be resorted to before long. There are no difficulties in approaching the roomy anchorage, where a depth of water capable of floating the *Great Eastern* can be obtained, and where ships lie in perfect safety.

"A large amount of deepening has been carried out at Port Pirie, and some useful reclamation of land made with the material raised. The depth of water at the Narrows has been considerably increased, and in a short time there will be no difficulty in approaching the wharves. When a clear wide passage, having a depth of ten feet at low water, is obtained, attention should be given to the Narrows at what is called the Outer Bar. A good flagstaff, set of signals, books, &c., and four complete sets of life-buoys and grapnels, have been supplied to this port during the year.

"The channel at Port Broughton has been much improved, and twenty new buoys now mark the principal points. A new entrance, more direct than the old one, has also been marked by two buoys, one on each side the channel; but the beacons still remain in the old channel for those who prefer that passage.

"The importance of Port Germein cannot long be overlooked, and such facilities as may be considered desirable should be provided to allow farmers the opportunity of shipping their produce on more economical terms than can be done at present.

"The sooner the new jetty at Port Wallaroo is completed the better it will be for all concerned. Bitter complaints are made (and not without cause) of the insufficient accommodation and consequent loss of time to ships chartered to load there.

"The name of Port Victoria should be altered, as the port, as originally fixed, is at the north end of Wardang Island. A French vessel lately chartered to load at Port Victoria anchored at this place, and after considerable loss of time the master ascertained where it was intended that he should take in his cargo. I understand that the name of the township is Wauraltee, and therefore suggest that the port in future be known as Port Wauraltee. A screw mooring has been laid down off the jetty for the convenience of vessels.

"Certain improvements have been made at Port Wakefield, but

deepening operations are much required to give greater facilities for dispatch than at present exist.

"On the completion of the breakwater at Port Victor, with which good progress is being made, this will be a safe and commodious harbour for a limited number of vessels.

"A flagstaff has been erected on an elevated position at Goolwa, so that the grounding of a vessel at or near the mouth of the Murray can easily be seen, and timely assistance rendered.

"Lighthouses.—The Board's annual inspection of the lighthouses of the colony was most satisfactory. They were, without exception, found to be clean and in excellent order; and I am pleased to state that the keepers had no complaints to prefer worth noting. I have on several occasions made private inspections at night, without the previous knowledge of the keepers, and in every instance have found the revolving lights keeping excellent time.

"A good bright light is now exhibited from the outer end of the Edithburgh Jetty.

"The red light at Port Wakefield has been altered to a white one, and the change has given great satisfaction.

"A light of the best description procurable is required for Cape Northumberland, which is a most important turning-point on our coastline, and should be provided with an electric or other first-class light without unnecessary delay, especially as doubts have been expressed as to the stability of the lighthouse. The Board visited the cape in August last, and recommended that a fixed electric light should be placed on a spot about 700 yards N.E. by E. from the present lighthouse (this alteration in the site would not practically affect navigation), and that the present light be removed to Cape Banks, between Rivoli Bay and MacDonnell Bay, where so many shipping casualties have occurred. The Engineer of Harbours also visited the site, and estimated that a first-order fixed dioptric light, with stone lighthouse and cottages, would cost £6,750; or if built of wood, £6,500. His estimate for an electric light, in a tower forty feet high, including four cottages, the agneto-electric machinery, engine, boiler, &c., would cost 0,000, and necessitate an annual expenditure of about £1,500.

The present optical apparatus might be utilised by erecting it on Cape Banks.

"A light (one of the third order would be sufficient) should at once be established on Corney Point, Spencer Gulf.

"A light of the first order on South Neptune Island would be of immense benefit now that weekly steam communication is opened up with England.

"It is also desirable to have a light either on Shoalwater or Plank Point, Spencer Gulf. The shoals here run out a considerable distance, and the coastline being very low it is difficult to make out the land even in clear weather. Irrespective of this, it must be remembered that the traffic to and from Port Augusta and Port Pirie is being rapidly developed, and a large amount of shipping passes up and down in visiting other places in the gulf. A third-order light would not be expensive, and would answer all purposes.

"By establishing third-order lights on Point Lowley, and either Plank Point or Shoalwater Point, and abolishing the lightship stationed on the west side of the Eastern Shoal, the requirements would be fully met for ships bound either to Port Augusta or Port Pirie, and the lightship could then be used for marking the entrance to Port Pirie.

"Sturt Lighthouse, Kangaroo Island, will shortly be connected by telegraph with Kingscote, and masters of vessels approaching Cape Willoughby will then be able to communicate with the city or any part of the world.

"It is also most desirable to have telegraph communication with Althorpe Island. In my report for 1878 I suggested a route, and recommended that the Superintendent of Telegraphs should be consulted, but have not heard whether any steps have been taken in the matter.

"Whilst on the subject of lighthouses, I most respectfully draw attention to the necessity there exists for the creation of a first-class light on Troubridge Island. When this light was erected it passed for a second-class light, but I feel certain that the third-class light at Rivoli Bay is infinitely superior to the one on Troubridge. As there are dangerous reefs lying fully three miles from the light,

and at times it is difficult to estimate the correct distance off, the Marine Board has come to the conclusion that it is not only desirable, but absolutely necessary, to establish a first-class light on this low-lying reef, and, in order to carry out this view, it is desirable for the Engineer of Harbours and Jetties to examine the present iron tower and report as to its capabilities for carrying the increased weight of a first-class holophotal apparatus and lantern.

"A signalman has been appointed at Cape Borda, Kangaroo Island, by the Telegraph Department, as it was found impossible for the lighthouse keepers to properly attend to the signalling of ships and carry out their ordinary duties as well.

"That our coastline is well lighted may be seen from the fact that we have now nineteen lights—six of the first order, one of the second order, three of the third order, four of the fourth order, and five harbour lights. The total number of keepers employed is fourty-four, and the amount spent for salaries, stores, &c., was £7,557 17s., being within £25 of the sum received for light dues.

"Tenders for the supply of high-test kerosine were invited, and a supply of 6,000 gallons was obtained at 1s. 5¾d. per gallon. Four hundred and eighty-four gallons of colza oil, 5,391 gallons of kerosine, and 20,800 feet of gas were consumed in the various lighthouses of the province during the year, the average quantity of kerosine used in the first-order lighthouses being about 690 gallons.

"The thanks of the Board are again due to the Governors of the Institute, to the Victorian Lighthouse Mission, and a few persons who have been kind enough to supply books, illustrated papers, &c., for the use of the lighthouse keepers.

"Light Dues.—Some considerable amount of dissatisfaction has been openly expressed by owners of colonial vessels on account of ocean-going steamers being wholly exempted from the payment of light dues, and I think that they certainly have reasonable grounds for complaint.

"The amount of light dues received for 1878-9 amounted to £7,533 11s. 2d., or about £160 less than 1878; but a reduction of one-third was made on the 9th June in favour of steamships [illegible]oyed in the intercolonial and home trade.

"MOORINGS, BUOYS, AND BEACONS. — The moorings at Port Adelaide and Port Augusta are in good and efficient order. Those at Port MacDonnell, Port Victor, and Waterloo Bay will shortly be examined.

"The buoys and beacons have, with few exceptions, received the annual overhaul, and buoys have been shifted where necessary.

"The Engineer of Harbours and Jetties is now erecting an iron screw-pile beacon on Eclipse Rock, Port Victoria; when completed, the buoy which marked its site will be removed.

"A similar beacon is necessary off Willunga, as several valuable buoys and their moorings have been irrecoverably lost from the end of the reef. The bottom is composed of uneven limestone, and, being exceedingly rough, wears away the heaviest chain cables in a short space of time.

"Mooring dolphins have been erected in the stream, at Goolwa, for steamers laid up after the wool season, and others at Port Broughton, for assisting vessels to and from the jetty.

"The amount of £772 14s. 3d. was expended on moorings, buoys, and beacons during the year.

"MARINE BOARD ACTS AND REGULATIONS.—The amendment of the five Marine Board Acts now in force has been postponed from time to time, awaiting further Imperial legislation; but, considering the number of Acts relating to merchant shipping which have been passed in England during the last few years, it is not likely that any further alteration will be made for some time. I therefore suggest that a new Bill be at once prepared with a view of remedying the defects in our present laws, and including subjects which are not dealt with at all—for instance, unseaworthy ships, grain cargoes, chain cables and anchors, and marking load-line.

"Some considerable time since, the Home authorities promised to draft a measure, and submit it to the Governments of all the Australian Colonies and New Zealand, on the subject of the mode of procedure in making inquiries into wrecks and casualties. Recently, however, we have been informed that such promise has been withdrawn, and on this most important point the present mode of procedure in the official Court of Inquiry in South Australia is altogether objectionable, and positively unfair to those

officers whose conduct may be called in question. I allude particularly to the constitution of the official court, where any Stipendiary Magistrate and two Justices of the Peace can hear and decide upon matters about which they have not the slightest skilled knowledge. When the Act was framed, the Marine Board drew attention to the necessity for the appointment of nautical assessors, but no notice was paid to the representations then made. This state of things should be remedied at the earliest opportunity. If it is considered desirable that two Justices should assist the Stipendiary Magistrate, it is still more necessary that at least two nautical assessors be provided for. If the Government are unable to introduce a comprehensive measure this Session, a short Act to meet the defects referred to should be prepared and laid before the Legislature on the re-assembling of Parliament.

"The Board obtained the permission of the Board of Trade to retain any certificates suspended in this colony for any period not exceeding six months, instead of sending them home. This was necessary in order to prevent injustice to officers concerned.

"The Marine Board Act, No. 155 of 1879, which was assented to by His Excellency the Governor on the 25th of October, was passed for the purpose of enabling the Treasurer to frame regulations for the transfer to the Engineer of Harbours, duties which, under previous Acts, had been performed by the Marine Board. The Act also made a slight but very proper concession to the holders of pilotage exemption certificates; the laws relating to gunpowder were extended to explosive substances of all kinds; and that part of the Act of 1873 which dealt with the examination of steam hoisting-engines used on the wharves and in ships was abolished.

"Fresh bye-laws, for regulating the landing, storage, and delivery of explosives of every description, have been prepared under the Marine Board Act of 1879, and, having received the necessary sanction, are now in force.

"Regulations affecting the survey of ships, crew space, &c., are now in print, and before the law officers of the Crown for examination.

"The examination of masters, mates, and engineers, has been

dealt with by revised regulations, which came into operation on the 1st October last.

"SURVEYORS, AND EXAMINERS OF MASTERS, MATES, AND ENGINEERS.—Thirty certificates of competency were issued during the year to masters and mates, and thirty-four certificates to engineers of river steamers and steam launches.

"One hundred and twenty-five steam vessels have been surveyed and certificates granted, and twenty-two vessels, principally steamships, have been 'swung' for adjustment of compasses.

"The death of Captain Blanch, F.R.G.S., the late Shipwright Surveyor and Examiner of Masters and Mates, has been a great loss to the department; his upright and gentlemanly conduct was appreciated by all who were in any way brought in contact with him. Captain Inglis, late of s.s. *Governor Musgrave*, has been appointed by the Marine Board as his successor.

"The Engineer Examiner, Mr. J. G. MacCulloch, has resigned his position in consequence of failing health, and the Board has conferred the office on Mr. John Campbell, late chief engineer of the s.s. *Governor Musgrave*.

"Fourteen certificates of exemption from pilotage have been granted to masters who were found qualified to navigate their respective ships within the limits for which they were granted, principally at Port Adelaide.

"PILOT SERVICE.—About the end of 1878, the Port Adelaide pilots procured two cutters for the purpose of boarding ships down the gulf, but the cutters were soon laid up, and matters now remain in the same unsatisfactory state as before. A ship is still seldom boarded until the anchor is down off the Semaphore, and this was the cause of the complaint made by the Colonial Office to His Excellency the Governor, referred to in my report for 1878.

"When the Marine Board Act of 1879 was passed, it was hoped that the strong recommendation made by the Board in favour of abolishing compulsory pilotage would be acted upon; but the only alteration effected was by making it unnecessary for the master of a ship holding a pilotage exemption certificate to employ a pilot on his arrival from a port beyond these colonies, which he was previously bound to do.

"Few complaints have been made against the pilots during the year; and the small number of shipping casualties which occurred, and for which the pilots were responsible, were, in all instances except one, attributable to unforeseen causes.

"Three hundred and sixty-nine vessels were piloted inwards, and 317 outwards, the amount of pilotage received being £2,721 10s. 10d.

"The amount of pilotage received by licensed pilots at the different outports was £642 4s. 10d. for sixty-five vessels in, and the same number out.

"MERCANTILE MARINE OFFICE.—During the year, 2,094 seamen of all grades have been discharged and 2,283 engagements entered into; 510 cases of desertion are reported, against 627 in the previous year; twenty-two deaths, arising from various causes; four distressed and two disabled seamen have been forwarded to their required destinations, and several others were assisted pecuniarily and otherwise; the number of permits issued to seamen to be allowed to ship amounted to 460; and the revenue derived from the Mercantile Marine Office amounted to £1,260 12s. 9d.

"REVENUE.—The revenue derived from all sources amounted to £12,530 3s. 4d., being slightly in excess of the previous year. Increases are shown under the heads of Gunpowder, Jetty Tolls, and Licenses, and very slight decreases under Moorings, Light Dues, Shipping Fees, and Surveyors' Fees.

"EXPENDITURE.—The total expenditure (including salaries) amounted to £23,335 14s. 2d. About £6,400 was spent on Government vessels; £7,500 on lighthouses; £800 on moorings, &c.; £7,000 on sundries for outports; and £600 on lifeboats, &c.

"BRITISH, FOREIGN, AND INTERCOLONIAL TONNAGE.—During the year 1,092 ships, of a total tonnage of 467,729 tons and carrying 23,024 men, were entered inwards, and 1,039 ships, representing 465,162 tons and carrying 22,149 men, were entered outwards. This shows an increase in every way over the previous year, the excess of tonnage inwards being about 15,000 tons.

"The increase in the size of vessels which now come to Port Adelaide is strikingly illustrated by the fact that in 1874 the greatest registered tonnage of any one such vessel was 1,800,

whereas in the past year thirty-one vessels above that tonnage were entered inwards, the largest being the s.s. *Orient*, of 3,340 tons register. It is scarcely necessary to say that these very large ships remain at the outer anchorage and do not come into the harbour.

"Only three ships, out of 953, have been detained at the outer anchorage for periods exceeding five days for want of sufficient water to cross the bars.

"LIFEBOATS AND APPARATUS FOR SAVING LIFE.—It is pleasing to report that the services in connection with the life-saving apparatus and lifeboats have not been required during the past year.

"RIVER MURRAY.—The Admiralty surveyors have finished the survey from Goolwa through the lakes to the entrance (proper) of the river, *i.e.*, the portion used by steamers. On completion of plans, an authentic chart will be available from the embouchure at sea, to the commencement of the narrows just below Wellington, and will show at a glance what is necessary before deepening and other operations are commenced to facilitate the navigation of Lake Alexandrina. The signalman reports that the sea entrance was navigable for 308 days, and that six steam-vessels had passed safely eighty-five times.

"OYSTER FISHERIES.—On the report of the Inspector for Oyster Fisheries, the Honourable the Commissioner of Crown Lands, on the recommendation of the Board, caused the whole of the beds in Coffin Bay to be closed until the 21st November, 1882. No doubt the beds required a rest, and the fishermen will have an opportunity of discovering fresh ones.

"A license was granted last year for working a natural bed off Point Riley, but I fear it has not proved a success, as few, if any, of the bivalves have reached Adelaide.

"SHIPPING CASUALTIES.—It is pleasing to record the fact that casualties attended with loss of life on our extensive coastline have been singularly few.

"The first of importance was that of a boat containing the captain and four men from the barque *Runnymede*. It appears that they left the vessel, off the Eastern Shoal, with the intention

of proceeding to Port Pirie. The boat, containing two men (greatly decomposed), was afterwards picked up on the east side of the gulf leading to Port Augusta, but the others were not found.

"The *Maria*, cutter, with only one man on board, was capsized in a squall, about three and a-half miles to the north-west of Port Adelaide Lighthouse. The man was drowned, and the vessel was raised and repaired.

"One man was killed on board the ship *Murray* whilst alterations to the slings of the foreyard were being carried out. Two others were injured on this occasion.

"The head keeper of the Althorpe Island Lighthouse reported the grounding, on the 24th February, 1879, off Reef Head, of a loaded barque, painted black, red bottom, very square yards, and double topsails. She was aground when first seen, but about an hour and a-half afterwards got off and made sail, bound southward; the wind was light and the sea smooth. From the description given, the vessel was supposed to be the *Ismyr*, of Liverpool, 594 tons, on a voyage from Port Pirie to the United Kingdom with a cargo of grain; and this supposition appears to have been correct, for the *Ismyr*, I believe, has never since been heard of.

"The hulk *Kadina* was destroyed by fire at the North Arm; the barque *Ganymede* was greatly damaged by fire at Port Pirie, and is now undergoing repairs; the ketch *Four Brothers* and the yawl *Sarah* sprung a leak and were beached, but afterwards repaired.

"The total number of casualties for the year was not great, and about 70 per cent. were simple groundings. Three small vessels sunk, four were damaged by fire (two very slightly), seven were accidents to boilers and spars, two sprang a leak, and twenty were collisions (but none were of any great importance), and four got foul of beacons.

"Most of the casualties took place in Port Adelaide, Port Pirie, and the channel leading to Port Augusta, so that there is reason for congratulation on the safety of our navigable waters. Only ordinary seamanlike precautions are, as a rule, necessary to prevent great damage, but when these are neglected, ships here, as well as in any other part of the world, will meet with accidents.

"MARINE BOARD OFFICES.—The new offices, which were entered on the 1st of October, are roomy and commodious. The lower portion of the building is devoted to Customs purposes; and the business of the Mercantile Marine Office is now transacted in the old Custom House, which is admirably adapted for the shipping and discharge of seamen. The advantage to the shipping community of having the Government offices in proximity to each other is of considerable importance.

"MISCELLANEOUS.—Some time ago, tenders were called for the removal of Webb Rock, and the Board were surprised to find that none of them were accepted. The present season is now too far advanced to admit of the work being carried out. The Board strongly advises its removal before another ship grounds thereon, or possibly the consequences may be more serious than when the *Tomatin*, a ship in ballast, drawing ten or eleven feet, lost her false keel through striking heavily upon it.

"The Government having approved of the survey, within certain limits, of the upper portion of Spencer Gulf, it is hoped that the Admiralty survey officers will soon be in a position to undertake the work.

"I have now before me a document, signed by the masters of five ships loading at Port Pirie, intimating that a large patch exists, having a depth of only three and a half and four fathoms on it, the latest Admiralty charts showing nine fathoms.

"It is greatly to be regretted that the Admiralty surveyors have received instructions to close their survey of the coastline of this province in March, 1881, as much work remains to be done, not only in deep-sea sounding, but also in Spencer Gulf, as just mentioned. Arrangements should, if possible, be made by the Government for retaining the services of these valuable officers.

"Complaints respecting the 'domicile' clause in Her Majesty's Order in Council, dated 12th February, 1876, continue to be made, and not without good reason. The matter, however, rests entirely with the Board of Trade, and representations which cannot, I think, be much longer overlooked, have, at various times, been made by the Marine Departments of the colonies. The present regulation has been the means of driving away many candidates for the

certificates of competency who were prepared to pass the examination, and has also put masters and owners of ships to considerable expense and inconvenience.

"I have, &c.,

"R. H. FERGUSON, President Marine Board.

"The Honourable Charles Mann, Q.C.,
"Treasurer, Adelaide."

DETERMINATIONS OF LONGITUDE.

AT the recent meeting of the National Academy of Sciences, at Washington, Lieutenant Commander F. M. Green, U. S. Navy, read an interesting report on the progress made by the United States Hydrographic Office in establishing, by the use of telegraph cables, a general system of secondary meridians of longitude. Geographers and chart-makers have been and are still greatly embarrassed by the difficulty of harmonising the different values assigned to the longitudes of nearly all points on the earth's surface outside of the United States and Europe. The English Hydrographic Office has selected fifty points at intervals, and assigned to each an arbitrary longitude, and on these positions their charts are constructed, but they do not harmonise, and many of them vary widely from the truth. The French Government has sought to establish a similar set of positions by observations of moon culminations, but the results are not satisfactory, and experts are agreed that where telegraphic communication exists, no method of determining longitudes equals, for accuracy and simplicity, that known as the American method, which consists in comparing, by means of the electric telegraph, two time pieces, one situated at each end of the line and the errors of which on local time are determined by astronomical observations. In this way differences of [illegible]itude are first measured from the initial meridian, and then the places so determined, step by step. In 1873 the United

States Hydrographic Office commenced this work, measuring step by step from Key West through the West India Islands to Panama on the West, and Port Spain on the east, fitting out two parties, each with portable observatory, transit instrument (with zenith telescope attachment), break-circuit chronometers and telegraph instruments.

Thirteen positions were exactly established in this way in 1874 and 1875. In 1877 and 1878 a similar chain of measurements was extended by Lieutenant Commanders F. M. Green and C. H. Davis, United States Navy, from Greenwich Observatory, by way of Lisbon, Madeira, Porto Grande, Pernambuco, Bahia, Rio de Janeiro, and Monte Video, to Buenos Ayres, there connecting with the chain of exact measurements made by Dr. B. A. Gould, at Cordova, extending to Ascension, Santiago, and Valparaiso. An interesting feature of this measurement was the demonstration that the Royal Observatory at Lisbon, and, indeed the whole coast of Portugal, should be laid down two miles further to the westward than has before been done. Altogether twenty-one positions on foreign coasts not heretofore exactly established have been determined with all possible accuracy, but a great deal remains to be done. The Russians have carried a measurement by similar means across Siberia, terminating at Wladiwostok, and the engineers of the Great Trigonometrical Survey of India have measured from Greenwich, through submarine cables, to Bombay and Madras. The chief of the Bureau of Navigation, Commodore W. D. Whiting, is very desirous to join the points of Wladiwostok and Madras by a measurement through the cables along the coasts of Japan, China, and Malaysia. This will give ten more exact points. Another important piece of work will be to measure from the Coast Survey station at Brownsville, Texas, by the lines of the new Mexican Cable Company, to Tampico and Vera Cruz; then across the Isthmus of Tehuantepec along the coast of Central America to Panama and Guayaquil. By this measurement, nine or ten more secondary meridians would be added to the list, and as soon as the war ceases between Peru and Chili, ten more can be added by the use of the line along the west coast of South America. A cable also connects the general East India system of

telegraph lines with Zanzibar and South Africa. This measurement will probably soon be made by the authorities of the observatory at the Cape of Good Hope, and upon its result will depend the longitudes of a great part of the east and west coasts of Africa, as well as the numerous islands of the Indian Ocean. These meridians once established, subsidiary chronometric measurement from them becomes an easy matter, and the present discordance between different lists of geographical positions will no longer exist.

The following longitudes of places in the West Indies were determined by telegraph by Lieut.-Com. F. M. Green, U.S. Navy, in 1875:—

	Latitude.	Longitude.
Havana (Morro lighthouse)	23° 9′ 20″·98 N.	82° 21′ 30″ W.
Santiago de Cuba (south angle of Blanca battery)	20 0 16·4	75 50 30·15
Kingston (Port Royal flagstaff)	17 55 55·8	76 50 37·8
Aspinwall (the lighthouse)	9 22 8·8	79 54 44·7
Panama (S.E. angle of south tower of Cathedral)...	8 57 6·15	79 32 12·3
San Juan de Piærto Rico (the lighthouse) ...	18 28 55·86	66 7 27·75
San Thomas (S.W. angle of Fort Christian)	18 20 23·15	64 55 52·5
San Croix (Lang's observatory, centre of transit pier)	17 44 42·7	64 41 17·4
St. John, Antigua (north tower of Cathedral)	—	61 50 27·9
St. Pierre, Martinique (upper light, St. Marthe battery)	14 43 53·9	61 11 11·7
Bridgetown, Barbados (flagstaff of Rickett's battery)	13 5 42·5	59 37 18·45
Port Spain, Trinidad (flagstaff of Water battery)	10 38 39·21	61 30 38·4

NOTES ON THE MARITIME DEVELOPMENT OF JAPAN.

(*Continued from Page* 314, *April number.*)

IN the February and April issues I briefly sketched the salient points in the growth and present position of the Mercantile Marine of Japan; but it may be well, for the benefit of those not in full possession of such particulars, to mention some points, hitherto omitted for want of space.

Foreigners' intercourse with Japan did not commence with Pinto's visit in 1542, as is generally believed. Portuguese vessels were in China waters during the second decade of the sixteenth century (from 1516). Both Lewchewans and Japanese had been for years well acquainted with those vessels of foreign build, known as "ships from the south" and "black ships."* Efforts had been made to improve the form of construction of the Japanese vessels even before Will Adams' day, and Japanese had voyaged afar to learn what was then known to European as well as Malay, Arab, and other seamen.

The enforced abandonment, in the early part of the seventeenth century, of all that they had learned during a century of intercourse with Europeans, did not altogether suppress the experience gained; but the system of provincial governments precluded any organization until the abolition of the Feudal system was commenced in 1868.

Of the numerous vessels of foreign build, purchased at prices far above their value, from the English, American, and other traders at the Treaty ports, the majority were no longer in a condition to be profitable to their owners, as I have already stated. It was no easy matter to induce the natives to entrust the management of all these vessels to one company, or to place them under any one department, where uniform and systematic, as well as economical management, could be attained. It was a still more hopeless task to control or in any way direct the various clansmen

* Foreign ships being painted black, a contrast to the native craft.

who were the only natives having the slightest knowledge of steamships or of sailing vessels of foreign rig. These men, hitherto quite independent, and utterly inexperienced, resented any effort on the part of foreigners, or of their own nation, even of their superior clansmen; and the only rules that they followed were such as suited the convenience or fancy of the moment. Magnificent schemes were propounded and even minute details elaborated, with the usual amount of feasting and consultation, and invariably such fell through, a want of energy, unanimity, and loyalty amongst the promoters being ever the cause.

The interference of interested or meddlesome members of the foreign community, traders, and diplomatists, especially of those who combined both functions, had much to do with the failure of the efforts of those who essayed to assist the natives in the establishment of an efficient Mercantile Marine in the first instance. An enormous amount of money has been squandered by the Japanese in the purchase of ships, in repairs, in experiments, with the view of monopolising trade, to the exclusion of the foreign trader and vessels under foreign flags; in dockyards, arsenals, and shipbuilding. They have now a large fleet of vessels under the management of one company, it is true, supported and heavily subsidised by Government, the *personelle* of which form the bulk of the shareholders, but no one well informed would dare to say that commercial success has been attained as yet.

Since 1864, the writer has, upon every opportunity, attempted to induce the native officials to pay greater attention to the important question of economical and well-regulated transport of produce and merchandise, and thus materially increase the national prosperity, and develope its latent resources. A greater eagerness has, unfortunately, been evinced to compete with foreigners than to establish a system of transport that would be directly and immediately beneficial to the people, and that would in time grow up to the exigencies of a trade beyond its own shores.

Japanese may be made into fairly good seamen and officers, and [it] has only been the absence of a system that has caused such [fe]w progress to have been made during the past fifteen years. [Th]ose natives who have gone amongst foreign nations to learn,

have been over anxious to return home, before they have gained sufficient experience, and therefore frequently failed in carrying out successfully important and extensive reforms or mercantile adventures, which their own stay-at-home countrymen had too readily entrusted them with.

No effort was made to control the shipping and discharge of seamen, to regulate the employment of competent native navigators, engineers, &c., or to encourage the training of men for such. There was nothing attempted in the way of encouraging the youth of adventurous turn of mind and energetic spirit to be apprenticed, with the inducement of rapid promotion when fairly earned. A commencement was made by initiating a check upon the foreigners employed, a very necessary step it is true, undoubtedly, but they left their own people out of the question at the time. Can it be wondered at, therefore, that all around the coast of Japan numbers of these dearly-purchased vessels have been wrecked, long before some had even earned the interest on their cost, to say nothing of the expenditure for wages, provisions, repairs, &c.

Before the days of foreign steamers, the number of native craft trading along the coast was something enormous, and as each carried several hands, a great number of men were employed, that might have been made into "fairly good hands." The anchorages at the trading centres were formerly crowded with native craft, where now an occasional visit from a steamer seems to be considered ample for the trade. The disappearance from the provincial towns of the noble and the small surrounding court, has also made a great change, but yet little is being done, compared to what might be promptly and efficiently achieved, in the employment of the great natural resources and the numerous population of the outports and the surrounding rural districts.

The amount of capital that has been, and is being squandered, in misdirected efforts to compete with existing established lines, would have amply developed a coasting trade that would have materially increased the exports of the islands, all of which might have been sold at the Treaty ports, to be carried away at lower rates of freight than any native company could ever succeed in effecting off their own coast.

It is true that years ago, New Englanders, Norwegians, Hamburgers, and others, were able to take lower rates of freight than the English, but this could never form a precedent for a recently established maritime national trade.

Had some combination been achieved between the Naval and Mercantile Marine ten or a dozen years ago, vast sums would have been saved to the country, and both services would have been materially benefited.

No one could rejoice more sincerely than the writer, not even the most patriotic and conservative of natives, to see the produce of the country carried in vessels manned by Japanese, aye, and even constructed in Japan of Japanese material. In 1864, I sailed a large barque of native timber, rigged with native made rope, native canvas sails, &c., built in Siam. Surely Japan need not be behind that small kingdom. There is a great future in store for Japan, but it is not, as I have already said, by entering into competition with efficient and wealthy existing lines, but by developing their own trade in the first instance, that they can lay the solid foundation for future grand efforts and commercial prosperity.

It should be mentioned that after the abolition of the Feudal system, and the Provincial Governments, the Central Government retained only a very few vessels that were merely merchantmen, and those as transports or store ships. So that after 1868 the distinction between the merchant shipping and the Navy became more defined. At the Government shipbuilding yards and arsenals but little attention has been given to the construction of merchant vessels, although extensive repairs have been effected, as well as the usual docking, &c. (About seven years ago I had the engines of a steamer "compounded"—the *Undine*, built by F. Wingate—and the work was most efficiently performed by Mons. Darbier, of the French staff of the arsenal, under the superintendence of Mr. Joseph Taylor). Under energetic management the natives need never have gone beyond their own establishments for the most extensive repairs, boiler work, &c., any time during the past ten years; nevertheless they have sent home here several vessels for new boilers, &c.

A few years more experience will prove costly to them, many of their most expensive vessels will, by that time, have become veritable "white elephants," and more money will be required for new ships, as well as for new boilers for many, and also engines for some. In the meantime, a few natives are gaining what knowledge they can on board of vessels under foreign flags, and more than one has made creditable progress in the study of his chosen profession.

In the absence of statistics it is difficult to say what progress has been made recently with regard to the most vital question of the conveyance of the produce of the land and labour of the people to a market, and at reasonable rates; once more I would commend this matter to the attention of my native friends.

C. PFOUNDES.

GHOSTS, SPIRITS, AND MEDIUMS.

"I CAN call spirits from the vasty deep." So said the superstitious Owen Glendower, a great many years ago. "Aye," said the sceptical Hotspur, "and so can I, and so can any man; but will they come when you do call them?" Sailors are popularly supposed to be a somewhat superstitious race. Many of them think if they sail on a Friday they run a great chance of going to the bottom; if they sit down thirteen at table, that one of them will die before the year is out. They have a lingering belief in omens and prophetic dreams, and it may, perhaps, be justly said that they have a somewhat greater belief in the supernatural—they have a greater tendency to see ghosts and hold communion with spirits—than the rest of mankind, and are therefore more liable to be imposed upon by the tricks of the so-called mediums of the present day. On this account it may, perhaps, not be altogether out of place in a nautical magazine to consider whether the belief in ghosts or spirits rests on any logical foundation, to trace the origin of

such beliefs, and examine for ourselves whether "these things are so."

The rapid advance of science has caused many beliefs and articles of faith, which were formerly taken for granted, to be shaken to their very foundations; one thing after another is being given up, till many well-disposed and pious persons begin to fear that soon there will be nothing left undisturbed. Articles of belief that have stood their ground for centuries have crumbled to the dust. Thinking men are no longer disposed to take for granted anything that cannot be brought to the law of reason, merely because other people thought so hundreds of years ago; neither are they altogether willing to obey the dictates of those placed in priestly authority, who may wish them to open their ears and close their brains, and believe what they choose to tell them. Yet, in spite of all this scepticism, in spite of the ever-growing tendency to explain all things in heaven and earth by natural causes, to place fact before mystery, and common sense before tradition or authority, it is strange what an amount of superstition still lurks in divers places. No doubt owing to the diffusion of scientific knowledge among the masses, and the giant strides education has been lately making, the soil is not quite so congenial as it used to be for the reception of the seeds of the belief in supernatural phenomena, still there are many scattered nooks and corners, both on shore and afloat, where they are still capable of being prolific and bearing a goodly crop. No sooner has one kind of marvel been explained and abandoned, than, like a phœnix rising from the ashes of the dead, another will take its place; no sooner has one devil been cast out, in a short time his abode is swept and garnished and ready for the possession of seven others worse than the first. There are still modern miracles, although the numbers of believers in them are growing "small by degrees and beautifully less." How firmly witches were believed in in the last century—how many thousands of unfortunate individuals were burned and drowned, on evidence that appears perfectly ridiculous in the present day! "To give up witchcraft," said John Wesley, "is to ..e up the Bible." Luther used to say, "I would have no com..sion on these witches, I would burn them all." But though ..tchcraft is now nearly dead, during the last few years a new

form of superstition has arisen, which exercises a great influence on many persons both in England and America, and it rejoices in the name of Spiritualism.

There is an inherent tendency in the human mind to know something of the world beyond the grave, "that undiscovered country from whose bourne no traveller returns," and this perfectly natural tendency has in all ages been traded on by charlatans and impostors. In the ancient times when the laws of nature were quite unknown, everything unaccountable was attributed to some mysterious spiritual influence, the gods were then supposed to be perpetually interfering with the affairs of men, speaking to them by their oracles, directing their movements, and taking a personal part in their battles. The rolling thunder was the voice of Jove; the sun, the moon, and the planets were each directed by their attendant deities; the mighty ocean, the heaving earthquakes, and the belching volcanoes were all ruled by their own peculiar gods. The Egyptians had their sorcerers and their wise men; the Chinese their divinators; the Greeks and Romans their oracles; the Indians their mountebanks and their great medicine men; the Israelites their prophets; the middle ages their witches, ghosts, and hobgoblins; and the enlightened nineteenth century has brought forth its mediums and spirits. Since the fall of witchcraft, however, until the last ten or a dozen years, the spirits have not condescended to visit us except at intervals. Occasionally a vagrant spirit has turned up who, doomed to walk this earth, looked in on its inhabitants and behaved like a gentleman to his acquaintance, usually some elderly party with a profound knowledge of the art and mystery of cup tossing and a predilection for waters strong. Within the last ten years, however, a disposition has declared itself on the part of many fractious spirits to depart from that sobriety of conduct which had for a long time characterised them. We now hear of aerial beings indulging in all sorts of fantastic humours, and doing things which were formerly supposed to be altogether material in their nature. This is said to be a very material age, and I conclude the spirits are catching the infection, and are gradually losing their fine ethereal nature and usurping the properties of matter. We

find them pulling and pinching the elderly and matter-of-fact, boxing the ears of the unbelieving, and talking sentiment to the young and gushing who are all soul. In fact the spirits often met with at a *séance* are a most unmannerly and disorderly set; they will break the furniture, create a disturbance, and apparently have no regard for the truth. Sometimes spirits are called up who will crack jokes with you; the ghost of your grandmother will perhaps appear and tell you to blow your nose. It is asserted by spiritualists that their science furnishes a proof of the immortality of the soul, but as Professor Huxley remarks, "The only good I can see in it is to furnish an additional argument against suicide; better live a crossing-sweeper than die and be made to talk twaddle by a medium, hired at a guinea a *séance*." They do, moreover, according to all accounts, talk their twaddle in a most inconsistent manner. Greek philosophers will talk English, and great poets like Shakespeare or Byron will be made to give vent to the most absurd common-places, which they would have been ashamed of during their lives. Space will not allow me to go into detail of the usual formula adopted at a *séance*. A number of people will form a circle round a table, with their hands joined; the table will shortly begin to run round, and replies to questions will be rapped out according to a code adopted by the spiritualist community. Some one present is chosen as a medium with whom the spirits will converse. These mediums can call up the spirits of the departed; they can heal the sick; they can prophesy; they can fly without even the aid of a broom-stick; and in fact there is nothing they cannot do. I remember once going to a *séance* where there were supposed to be some good mediums present. The lights were put out (spirits can't stand the light of day) and after a time some of the circle said they felt a cold blast of air coming over them, then the table began to run round and every one ran after it. One of the ladies then said she felt the table rising up into the air. I felt underneath, however, and the legs were certainly not off the ground. After this a few raps were heard, but nothing more transpired. As I was supposed to be a sceptic, I was asked to leave the circle. I did so, and stood against the mantelpiece. The rappings, however, did not improve

very much in coherency, so thinking the spirits were rather shy, I commenced a little rapping on my own account, and gave replies to various questions, which produced great satisfaction. No spirits, however, became visible to the naked eye. No doubt if there had been a professional medium present, some lovely creature draped in white would have appeared. This, however, was only a private *séance.*

There seems to be an irresistible tendency in the human mind to ascribe to supernatural agencies those events which we cannot explain, and there always have been, and always will be, individuals whose love for the marvellous is so great, and whose logical powers are so small, as to render them susceptible of entertaining any belief, however absurd it may be; and there is a still more numerous class who, staggered by facts which they cannot understand, grasp at any hypothesis which may be suggested rather than confess their ignorance. Now, I have no doubt that all these spiritualistic phenomena can be accounted for, partly on the theory of trickery, jugglery and imposture, and partly on well-known characteristics of the nervous and muscular system. In the professed mediums, those who make a living by their trade, there is nothing but rank imposture. The spirits they conjure up may have "no speculation in their eyes which they do glare withal," but the speculation they once possessed seems to be here opened to the mediums who invoke them, and a very paying speculation they make of it, notably, Mr. Home, who persuaded a silly old woman to leave him £50,000 on his representation that the spirit of her deceased husband ordered it. Dr. Hammond, professor of mental disease in New York, who has written a small book on Spiritualism, relates a case which strikingly illustrates the jugglery part of the business. He says: "A short time since I invited several medical and other friends to witness in my library some surprising spiritualistic exhibitions by a first-class medium. The operator went through all the performances of the Davenport Brothers to the entire satisfaction of the audience. He was securely tied by a gentleman who had been an officer in the navy, and who exhausted his strength and ingenuity in devising bands and knots: A screen was placed in front of the medium and in

an instant an accordion was played, a bell rung, and a tambourine struck. The performer then requested that the screen might be removed, and on this being done he was found to be tied in precisely the same manner as at first. The gentleman who had bound him declared that not a cord or knot had been interfered with. The rapping of this gentleman was perfect, and he read communications from the dead, made on folded slips of paper with a skill equal to that of the most highly-gifted medium. The astonishment of the audience was great, when he informed them that all these performances were deceptions which he then explained in the most satisfactory manner." I have seen Messrs. Maskelyne and Cook perform somewhat similar feats and have assisted to tie them. Among cases of rank imposture may be classed those in which the spirit appears visibly among the audience and talks to them in an amicable manner. It is always observed that the spirit, generally a female one, bears a remarkable resemblance to the medium who is supposed to be fastened in a cabinet. These higher manifestations, however, are seldom vouchsafed to any but true believers who will not investigate too closely. They have lately been so often exposed that the game is almost played out. On one occasion there was a sceptic present who put his arm round the waist of one of these spirits—the acting medium being a young person who rejoiced in the name of Katie King—and endeavoured to snatch a spiritual kiss, but he found out, in consequence, that these aerial beings can use their nails. In fact anyone who goes to these *séances* with the intention of exposing them must be prepared for a free fight with the spirits and their followers.

There is no doubt, however, that there are cases remaining where imposture is out of the question, rappings and tiltings of the table will occur in private meetings, and people imagine they see strange sights. The explanation, however, is very simple; these rappings and tiltings are caused involuntarily by the people present, and many of the marvellous things supposed to be seen are simply the products of their own brain; they come from within and not from without. In order to explain this, it will be necessary to say a few words on what are called subjective sensations. Sen-

sations may be subjective as well as objective, due to an internal instead of an external cause. As an illustration, let us consider what takes place in the domain of sight. When we see an object it is due to the waves of light proceeding from the object, impinging on the retina and there forming an image ;—this image is perceived by the mind, by the optic nerve conducting the impression to the brain, and there exciting to action that particular part of the brain connected with the organ of sight, transforming the sensation into an idea. In the same way waves of sound cause a certain vibration of the tympanum or drum of the ear ; this is communicated to the small bones in the interior, and carried thence by the auditory nerve to that part of the brain connected with it. But these particular parts of the brain may also be set in motion by a stimulus from within, instead of from without, hence what are called subjective sensations, sensations having no objective reality. In fact each particular sensation requires constant testing with the reports of other senses, before we can be absolutely certain that it is due to an external reality. In that horrible malady termed delirium tremens, the wretched patient hears voices, sees horrible things ; diabolical looking cats, devils, toads, old women crowding the room, and you cannot possibly persuade him it is all fancy ; the images are impressed with such terrible distinctness on his brain and yet in his lucid intervals he knows they are imaginary. But people in the full possession of their senses are sometimes subject to such appearances for which no cause can be assigned. Sometimes they know they are all imaginary, as in a remarkable case related by Sir David Brewster, of a lady who was constantly seeing the image of her husband, and of actually talking to him, but who found out afterwards that he had not been in the room at all. Sometimes in her husband's presence she would suddenly say, there is a cat in the room, and point to the spot, and perhaps try to seize it. She was always, however, perfectly ready to be convinced that it was all an illusion, or else she would have been the heroine of many a perfectly well-authenticated ghost story. When the state of cerebral excitement is so intense as to domineer over the controlling suggestions of the other senses, then these subjective sensations may be termed

hallucinations, and produce what are considered by the superstitious to be ghosts, supernatural visions, inspirations, &c. What was the dagger of Macbeth but a "dagger of the mind, a false creation proceeding from the heat-oppressed brain?" What were the angelic visions of Joan of Arc when it is said—

> "She sees a form we cannot see,
> Which beckons her away;
> She hears a voice we cannot hear
> Which tells her not to stay."

These are simply examples of hallucinations. It is well known that Socrates was haunted by a familiar demon, and Martin Luther is stated to have got rid of his superfluous energy by occasionally indulging in a pugilistic encounter with his Satanic Majesty, and in spite of the traditionary horns and pitchfork and unlimited command of brimstone, the prince of darkness generally came off second best.

Now, it is a well-known fact that these peculiar conditions of the mind can be induced by what is called by some animal magnetism, by others mesmerism. It is supposed by some that a peculiar force termed animal magnetism, or psychic force, emanates from the mesmeriser, and produces its influence on the subject, but of this there is no proof. It is doubtless true that the brain and nerves are constantly producing force, and that this force is closely allied to electricity, but we have no proof that this force can escape its bounds and operate on other individuals, and as most of the facts of mesmerism can be explained without this supposition, there is no reason to have resort to it. Anyone having the requisite susceptibility can put himself in the mesmeric sleep by fixing his eyes and his attention steadily and unremittedly upon an object made to project a little way from the centre of his forehead. This shows that the influence is from within as much as from without, and depends on the mental attitude in which the person mesmerised is led to place himself, it is, in fact, an effect produced on the imagination. Some people have the power of throwing themselves into this state by an effort of the will, without any external cause whatever. However it may be produced, of the facts of mesmerism there can be no dispute; under its influence

the subject can be sent into such a profound sleep that surgical operations can be performed without pain. He can be made to obey the will of the operator, and to do or think anything he is told. He can be made to fight, sing, or cry; imagine himself in deadly peril, fancy he is going to be shipwrecked, and call on someone to save him, &c. The fact is he is readily acted on by any idea that may be suggested to him, and therefore his evidence as to what takes place in this state is absolutely worthless.

I think it highly probable that many of the persons who testify to seeing or hearing extraordinary things at these so-called spiritual *séances* are put into a semi-mesmerised state, and can be made to see or hear anything which the medium may desire. Look at all the surroundings of a *séance*—a dark room, a dead silence. The imagination strained to the highest pitch of excitement by the expectation of something supernatural. Can it be wondered at that nervous and susceptible persons should soon begin to see visions or dream dreams; that they should hear spirit voices or see spirit forms? It is perfectly natural that they should do so. It is no argument in proof of the reality of spiritualism, that many persons in a room see the same things, since it is well known that many nervous disorders affect large bodies of persons at one time, and seem to be propagated from one to another by a species of moral contagion. This is well illustrated in certain religious sects, such as the ranters and jumpers, the convulsionnaires of St. Hédard, and others. Nervous people laugh and weep because others do so, and it would seem, moreover, that quantity is a very important ingredient in these nervous epidemics, they are much more difficult to be resisted when a large number of persons similarly affected are brought together. It is well known that Theodore Hook, in his experiment on popular credulity, persuaded a London crowd not merely that *he* but *they* could see the lion on the top of Northumberland House wag his tail. It is asserted that some persons in a mesmerised state are clairvoyant mediums; that the intelligence which then deserts the brain, concentrates itself in the stomach or at the tips of the fingers; that persons in this state will read letters or books placed upon their stomach; will tell what is going on at a distance, what has taken place in the

past, or what will take place in the future, and that for them, in fact, time and space has no meaning. But as Dr. Watson remarks, "Credat Judæus Apella, non ego." Dr. Hammond relates a case of mesmerism and clairvoyance which is highly suggestive. He had a patient who, besides natural somnambulism, possessed the power of inducing the mesmeric state at will. Her process was to take up a volume of some philosophical work which she was then studying, select a paragraph requiring intense thought, read it, close the book, fix her eyes steadily, and then reflect deeply on the sentence she had read. From the reverie thus produced she gradually passed into the mesmeric state, in which it was asserted that she answered questions correctly, read books held behind her, described scenes passing in distant places, and communicated messages from the dead. But, alas! when Dr. Hammond put her to the test she sadly broke down. "Having satisfied himself that she was completely mesmerised, he asked if there were any spirits in the room, and in reply she stated that the spirits of Socrates, of Plato, and of Schleirmacher were present. She was then asked if Shenkelfurst (an imaginary person, who was mentioned as Schliermacher's bosom friend) was not also present. For a moment she was silent, then her face was lit up with a smile and she exclaimed, "I see him," and proceeded to describe his person and dress, and how he embraced his philosophic friend. Bruno then appeared on the stage and made a few remarks. To change the current of her thoughts the Doctor asked her to tell him who would be his first patient on that day week? Where his father was then? and to these questions she gave answers which proved to be totally wrong. The following conversation then ensued. "Where are you now?" "In New York." "No, you are in a vessel at sea; there is a terrible storm, are you not afraid?" On the suggestive theory she at once replied, "Yes, I am very much frightened, what shall I do? Oh save me, save me." She wrung her hands, screamed with terror, and in the midst of this agitation returned to her natural condition. This is a very instructive case and explains a great many instances of so-called trance mediums. They only want careful sifting by competent persons to vanish into nothing.

It is also asserted that there are medical mediums, who possess the power of diagnosing and curing diseases. The great essential in these cases, however, is faith, which seems to be the sheet anchor of spiritualists. If you only believe a spirit will be seen, or a miracle performed, the spirit is sure to appear and the miracle takes place; the supply is always equal to the demand. There is no doubt, however, that faith is a most potent agent, and is capable of accomplishing wonderful things. It is a fact, that a strong belief that a bodily disorder will be cured by some appliance, itself innocent of good or harm, may so affect beneficially the nutrition of a part as actually to cure it. Ceremonies and charms, gesticulations, amulets, and the like have in all ages been largely used in the treatment of disease, and it may be presumed they have derived their power, not from any contact with the supernatural, but as Bacon observes, "By strengthening and exalting the imagination of him who used them." Hence then the occasional cures of spiritual mediums, the miracles of Professor Newton, the efficacy of the royal touch, the miracles of the Virgin Mary, and the injurious influence exerted by witches. Bread pills have cured many diseases, and quackery of many kinds still flourishes in all its forms and infinite variety.

W. SPOONER, L.R.C.P.

SPECIAL RULES FOR NAVIGATION IN SWEDISH WATERS.

IN addition to the International Rules of the Road at Sea, which have been adopted generally by the Swedish Government, the following special rules are also in force for ships navigating in Swedish waters:—

"Art. 27. The International Rules shall be in force in all vessels in Swedish waters, with such exceptions and additions as are spoken of in the following Articles.

"Art. 28. The lights mentioned in the Art. 3, 4, 6, 7, 8, 9, 10 and 11, shall be carried in all kinds of weather from twilight after sunset till dawn before sunrise.

"Art. 29. Steamers or steam-launches without masts are compelled to carry a white light at least as high above the ordinary side-lights as the breadth of the vessel. Steam-launches as well as smaller steamers with plying limits have to carry lights of such strength that their light is seen on a dark night with clear air, the white light at a distance of at least two nautical miles and the other lights at a distance of at least one nautical mile.

"Art. 30. Steamer or sailing ship is not bound to use those signals in Swedish waters which are ordained for certain occasions in Art. 5.

"Art. 31. Concerning light signals for pilot boats in Swedish waters, orders are given in the Pilot Rules.

"Art. 32. Steamship in motion has a right in Swedish waters in case of mist, fog, or snow, to give a special course-signal as well as the one signified in Section 12a, so that after the said signal given with one steam-whistle of two, so placed as ordained in Art. 12, the one with a treble sound and the other with a bass, directly after give one, two, three, or four short sounds with the other whistle, to testify the point of the compass which is nearest in accordance with the magnetic course of the steamer, according to the following system :—

SOUNDS OF ATTENTION.	COURSE SIGNAL.	COURSE.
With the Treble Whistle.	*With the Bass Whistle.*	*Signified by the Signal.*
One long sound according to Art. 12a.	Instantly followed by One short sound.	NORTH.
Do. do. do.	Do. do. Two short sounds.	NORTH-EAST.
Do. do. do.	Do. do. Three do.	EAST.
Do. do. do.	Do. do. Four do.	SOUTH-EAST.
With the Bass Whistle.	*With the Descent Whistle.*	
One long sound according to Art. 12a.	Immediately followed by One short sound.	SOUTH.
Do. do. do.	Do. do. Two short sounds.	SOUTH-WEST.
Do. do. do.	Do. do. Three do.	WEST.
Do. do. do.	Do. do. Four do.	NORTH-WEST.

"Art. 33. If a vessel, steamer, or sailing ship, meets a boat in Swedish waters which is towing another and there is fear of collision, the first-mentioned ship shall get out of the way of the one that is towing.

"Art. 34. If a steamer and a sailing vessel meet in a channel too narrow for two vessels to pass each other without danger of collision, the steamer shall lessen her speed or stop while the sailing vessel passes by. If two steamers meet in such water, the one that arrives last waits till the other one has passed. A steamer towing another vessel or not, shall always, on arriving to a narrow passage after dark or in fog, make his presence known by a long sound from the steam-whistle.

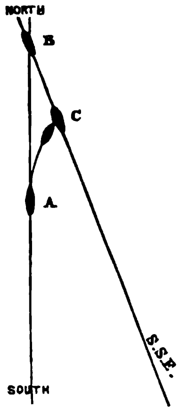
"Art. 35. Every vessel shall in general show, by his manœuvre, as early as possible, how she intends to pass a meeting ship."

A steamer in Swedish water has a right, according to Article 32, to give a special course signal, in order to lessen the causes for a collision. The Rules do not however mention what is understood by Swedish water. Most likely this is considered to stretch one geographical mile to sea round the coast of Sweden. Many steamers going to the Baltic will therefore in passing through the Oresund have to pass through Swedish waters, and masters of such vessels ought to know about the Swedish system, which is nothing but a detailed compilation of an English proposition, written in the *Nautical Magazine*, March, 1877, page 279, signed "Yarmouth, 9th February, T.E."

The master of a ship who happens to be in the North Sea in a fog can signalize what course he has to another ship which is close to him, and that is of course very good. But there is an element of uncertainty in connection with this system, which somewhat militates against its usefulness at all times: for instance, if it is desired to signalize north-north-east it can be done in two different ways, viz., with one long treble sound and one short bass sound, or with one long treble sound and two short bass sounds. Hereby the *real* course can deviate four points from the one signalized, which signifies a great deal in a collision.

The following example illustrates a very general case of collision at sea, and shows clearly enough the deficiency of the new

Swedish course-signal system, when used to prevent collisions at sea.



A steamer (A) which is steering "north" in a fog, hears a long bass signal right a-head, immediately followed by a short treble sound, and judges from this that another steamer (B) is right a-head, steering south. (A) therefore alters her course to north-north-east in order to pass clear of (B), but soon after hears right a-head, or very near so, a long-drawn sound, according to Art. 12, given every other minute, till the master of (A) to his dismay hears screams from another vessel, and directly after sees the hull of it close to the stem, which cuts down (B) right to the water and sinks her in a few minutes. From the master of (B), who was saved, as well as the whole crew, the master of (A) was informed that (B) was steering south-south-east, and it was also proved that he had signalised *south* to intimate that head point of the compass which was nearest in accordance with the magnetic course of the steamer.

CORRESPONDENCE.

EXAMINATION FOR MASTER'S CERTIFICATE.

To the Editor of the "Nautical Magazine."

Dear Sir,—I beg leave to address you in regard to the regulations concerning the examination of Masters in the Mercantile Marine.

Before the year 1878, while under the former conditions the regulations were :—" An applicant for a master's certificate must have served six years at sea, of which one year must have been as first or only mate." This has, however, been supplemented since the month of August in that year, by the following:—" Or

he must have served six years at sea, of which 2½ years must have been as second mate, during twelve months of which he must have had a first mate's certificate." In this last, the first thing that an observer would ask, is, since the first mate's servitude has been dispensed with, of what consequence can the possession of the certificate be? It must, I am sure, be evident to the majority of your readers, that the reason the first mate's servitude was formerly insisted on was because the relationship of the first mate to the master was so confidential, and his duties on board of a ship so responsible and trustworthy, that his servitude would eminently train him for a master's situation, just in the same way as a second mate's duties train him for the position of first mate. But the possession of another certificate cannot make any difference in the servitude of its holder; it only gives him license to take a situation which he has proved he is competent for, and which will qualify him for his next certificate; therefore if second mate's servitude is sufficient to qualify for master, why trouble about passing for first mate at all? Why not go another step in the wrong direction and let candidates pass for master at the expiration of their second mate's servitude without passing for first mate at all? It is universally admitted that foreign examinations of masters are more strict and severe than our own, yet, while we are daily hearing complaints of the degeneracy of our seamen, the Board of Trade pass such an injurious rule; which, although it does not affect the examinations themselves, does so lower the conditions that we may look for the public to be greatly increasing their unflattering remarks and insurance offices their losses. Indeed, it would seem the Board of Trade themselves have come to the conclusion that the examinations are too lenient, and have, of late years, made them more stringent; but with all respect to the examinations, the first mate's servitude so wantonly struck off is from its practice and effect, worth any amount of extra work; for, at this present, so well-known is the work required, so skilful the crammers, that they are enabled to pass even the most obtuse or inexperienced.

In all emigrant vessels and some of our large passenger lines, one of the orders on board is, that all first mates on these

ships must have a master's certificate, so that the ship will go to sea with at least more than one man fit to take charge in case of sickness or death of the master; which is evidently a very proper precaution in cases of such responsibility. Yet it is very questionable if this excellent rule has not led to the introduction of that far from excellent supplementary regulation of the Board of Trade which I am now bringing before you. For it is plain that in such lines no one wishing to rise could ever think of joining them without a master's certificate; yet there have always been plenty who, looking at the present without thought for the future, would prefer to join as junior officers, service on board such ships being very preferable to almost any other, without having the necessary qualification to enable them to rise; and after spending some considerable time, often many years, have to do in the end what they should have done at first, that is, take service in some other company, where they will be able to obtain it. Unthinking people exclaim on the hardship of the case, which is scarcely to be wondered at, when so able and practical a writer as "The Octopus" takes exactly the sa view, instead of blaming such people's own narrow view looking to the present without thought for the future.

This class alone could have been had in view in the fram such a regulation, as I have no hesitation in affirming, that only the outside public but the generality of the profession, all condemn it as a most detrimental one to the interest of all concerned in the Mercantile Marine. If this is not the reason, perhaps some other of your readers can inform us how it is that the 'Board of Trade' could so modify as almost to cancel one of their most excellent regulations.

Perhaps indeed, although it is scarce possible, they may hav tionbu idea of being more indulgent for future candidates, but i Marine ould only compare it to the indulgence of a man who Before ise his sons from school because they did not like the regula of having to learn.

have

as fi

ine

I am, dear Sir, yours sincerely,

A. R.,

An admirer of the *Nautical Magazine.*

HINTS ON ENTERING HOT CLIMATES.

To the Editor of the "Nautical Magazine."

SIR,—In such a publication as yours it may be useful to record experiences which may be serviceable to those visiting hot climates for the first time, and accordingly I beg to submit the following advice, which I have found from practice to be really efficacious in preventing illness:—

On first entering hot climates, avoid, as much as possible, exposure to the sun's rays and the night air for the first ten or twelve days.

Before going on deck of a morning or leaving your bedroom, eat a small piece of biscuit or stale bread, as a check to malaria injuring the stomach; which H.R.H. the Duke of Edinburgh, on my submitting it to him in the West Indies, was pleased to call "corking the bottle."

Remove all used linen as soon as possible from sleeping cabins, rooms, chests, bags, &c.

Drink, at least, a wineglass full of *water* after eating *fruit*, *…oked vegetables*, and *fish*, as the most natural solvent for such …, instead of spirits, wine, or beer, checking tendency to …ntery, indigestion, and the like.

…rusting you may think the above worthy of publication,

I am, yours faithfully,

W. H. BROWN.

Lyme Regis, 1st June, 1880.

FOG-SIGNAL AT THE SMALLS LIGHTHOUSE.

To the Editor of the "Nautical Magazine."

SIR,—Can you tell me why there is such a long interval (half-…our) in the firing of the "fog-rocket" at the Smalls (West Coast, Pembrokeshire).

At the "Tuskar" (South-East Coast of Ireland) the interval is …ive minutes.

…I think in such a swift tideway, like the current at the Smalls, an interval of ten or fifteen minutes would be much more help to

masters than the present arrangement. I should like some other of your correspondents or subscribers, to give an opinion.

Hoping I am not trespassing on your valuable time,

I remain, yours truly,

INQUIRY BRISTOL.

Wexford, May 30th, 1880.

[We believe the fog-signal rocket at the Smalls is still regarded as an experiment in regard to the feasibility of firing, &c., from a rock lighthouse. Another important consideration which affects the question is, no doubt, the accommodation for safely stowing a large number of rockets and explosive charges in the limited space available in the lighthouse tower.—Ed. *N. M.*]

PROPOSED BENEFIT SOCIETY FOR SICK SEAMEN.

To the Editor of the "Nautical Magazine."

Sir,—If you will kindly allow me a small space in your valuable magazine I will bring under your notice a subject which appears to me to be of some importance, namely, the practicability of establishing a sick benefit society for seamen in London. I suppose that most (if not all) other trades or professions have their clubs. Why not seamen? It is quite true that we may enter other societies, but, in the first place, most societies hold their meetings in public houses or beershops. Now this is a great objection to men who wish to avoid temptation. It is useless to say a man may go there and not drink, or that he need not attend at all; a member of a club naturally wishes to know how it is progressing, and seamen, as a rule, are not so firm of purpose as to resist the power of temptation brought to bear upon them in this case. Such clubs as the "Hearts of Oak" are exceptions, but these do not admit sailors; of course seamen who are single in case of sickness can go to the Seamens' Hospital, at Greenwich, but, with married men, the case is different. In the absence of the "bread-winner" who is to support the family? It is not necessary for me to tell you that officers' wages, at the present day (all things considered), are insufficient to provide for a day of

sickness, and, for my part, I see no reason why such a club for officers should not exist, and be as well supported as any in London.

I am sure that I am not the only one who feels the necessity for such a thing. There are many people who appear willing to benefit our class; now this seems to me a rare chance for such philanthropists. Imagine the comfort it would be to a man on leaving home to know that in the event of leaving his ship through sickness his wife and family would be cared for. I have written this hoping that those who have the power may also have the will to take the matter in hand, and bring it to a successful issue, if so, none will be more ready to support such a movement than

Your humble servant,

CHIEF OFFICER.

"PORT" AND "STARBOARD."

To the Editor of the "Nautical Magazine."

Sir,—With reference to an argument which appeared lately in your columns about the use of the term "port" and "starboard" in steering, it seems to me that in vessels using steam steering-gear, no small number in these days, the difficulty might be got over by the use of a lever which should act on the machinery like the old tiller, in place of the *wheel*. The *steersman* could not then go wrong, and the only thing to guard against would be the use of the *hand* in directing him, a verbal order I think could not be misunderstood.

I am, Sir, your obedient servant,

WILLIAM B. WHALE.

12, Queen's Road, Upton Park, E.
June 16, 1880.

TIDE TABLES FOR JULY, 1880.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M.	London Bridge. P.M.	Hull. A.M.	Hull. P.M.	North Shields. A.M.	North Shields. P.M.	Leith. A.M.	Leith. P.M.	Devonport. A.M.	Devonport. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
Th	1	8 27	8 57	0 57	1 27	10 27	10 59	9 22	9 53	—	0 4
F	2	9 30	10 7	1 57	2 27	11 31	—	10 24	10 55	0 39	1 14
S	3	10 40	11 15	2 57	3 28	0 2	0 33	11 26	11 56	1 48	2 22
S	4	11 47	—	3 59	4 28	1 1	1 28	—	0 23	2 54	3 25
M	5	0 16	0 43	4 54	5 16	1 53	2 16	0 48	1 10	3 55	4 20
Tu	6	1 6	1 28	5 37	5 57	2 36	2 55	1 31	1 51	4 44	5 5
W	7	1 48	2 8	6 17	6 37	3 13	3 31	2 10	2 28	5 24	5 43
Th	8	2 26	2 42	6 56	7 14	3 49	4 6	2 45	3 2	6 2	6 20
F	9	2 59	3 17	7 32	7 50	4 23	4 40	3 19	3 36	6 38	6 55
S	10	3 34	3 52	8 6	8 22	4 57	5 14	3 52	4 8	7 10	7 25
S	11	4 9	4 27	8 39	8 56	5 32	5 50	4 26	4 41	7 41	7 58
M	12	4 43	5 1	9 14	9 33	6 9	6 28	5 3	5 22	8 15	8 32
Tu	13	5 19	5 37	9 52	10 12	6 48	7 9	5 43	6 5	8 49	9 6
W	14	5 57	6 17	10 33	10 56	7 31	7 55	6 27	6 51	9 25	9 47
Th	15	6 40	7 5	11 22	11 53	8 21	8 49	7 17	7 44	10 10	10 36
F	16	7 30	7 57	—	0 25	9 21	9 56	8 15	8 50	11 6	11 39
S	17	8 28	9 5	0 58	1 31	10 33	11 10	9 27	10 4	—	0 16
S	18	9 45	10 21	2 5	2 41	11 47	—	10 41	11 18	0 57	1 39
M	19	11 2	11 42	3 19	3 56	0 24	0 59	11 53	—	2 20	3 1
Tu	20	—	0 19	4 31	5 1	1 31	2 1	0 25	0 54	3 39	4 13
W	21	0 48	1 16	5 29	5 56	2 29	2 54	1 22	1 49	4 43	5 12
Th	22	1 44	2 12	6 23	6 49	3 18	3 42	2 15	2 40	5 40	6 6
F	23	2 36	3 0	7 14	7 38	4 6	4 30	3 3	3 25	6 31	6 54
S	24	3 22	3 45	8 0	8 21	4 53	5 15	3 47	4 9	7 14	7 34
S	25	4 8	4 30	8 42	9 2	5 36	5 57	4 30	4 51	7 54	8 14
M	26	4 49	5 10	9 22	9 42	6 17	6 37	5 12	5 33	8 32	8 49
Tu	27	5 29	5 48	10 2	10 22	6 58	7 19	5 54	6 16	9 5	9 21
W	28	6 9	6 29	10 43	11 6	7 41	8 4	6 38	7 0	9 38	9 56
Th	29	6 49	7 11	11 32	[illegible]	8 26	8 57	7 24	7 51	10 16	10 40
F	30	7 [illegible]	8 2	0 [illegible]	0 32	9 28	10 [illegible]	8 23	8 57	11 6	11 35
S	31	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0 10

Week Day.	Month Day.	Dover. A.M.	Dover. P.M.	Weston-Super-Mare. A.M.	Weston-Super-Mare. P.M.	Liverpool. A.M.	Liverpool. P.M.	Greenock. A.M.	Greenock. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H.M.	H. M.	H. M.
Th	1	5 30	5 58	0 43	1 14	5 46	6 21	6 23	6 54
F	2	6 28	7 0	1 47	2 21	6 56	7 29	7 26	7 59
S	3	7 36	8 9	2 57	3 33	8 2	8 33	8 34	9 6
S	4	8 40	9 7	4 9	4 41	9 2	9 28	9 37	10 5
M	5	9 32	9 55	5 9	5 35	9 50	10 10	10 30	10 52
Tu	6	10 17	10 38	5 58	6 20	10 30	10 50	11 13	11 34
W	7	10 59	11 19	6 41	7 1	11 9	11 27	11 55	—
Th	8	11 39	11 58	7 20	7 38	11 45	—	0 15	0 34
F	9	—	0 17	7 55	8 11	0 3	0 20	0 52	1 10
S	10	0 35	0 53	8 27	8 48	0 37	0 54	1 27	1 43
S	11	1 12	1 31	8 59	9 15	1 11	1 28	2 0	2 17
M	12	1 50	2 9	9 32	9 49	1 45	2 3	2 35	2 53
Tu	13	2 28	2 48	10 6	10 23	2 22	2 42	3 12	3 31
W	14	3 8	3 29	10 40	10 59	3 2	3 23	3 51	4 12
Th	15	3 51	4 14	11 20	11 45	3 45	4 11	4 34	4 58
F	16	4 38	5 5	—	0 14	4 40	5 13	5 24	5 54
S	17	5 35	6 8	0 46	1 24	5 50	6 31	6 28	7 4
S	18	6 44	7 25	2 5	2 48	7 13	7 53	7 43	8 21
M	19	8 6	8 48	3 31	4 14	8 30	9 4	9 4	9 40
Tu	20	9 15	9 46	4 52	5 26	9 33	10 1	10 13	10 43
W	21	10 16	10 44	5 58	6 28	10 28	10 55	11 12	11 41
Th	22	11 12	11 30	6 55	7 21	11 21	11 46	—	0 9
F	23	—	0 5	7 45	8 6	—	0 10	0 35	0 59
S	24	0 20	0 52	8 26	8 46	0 32	0 53	1 21	1 43
S	25	1 11	1 30	9 5	9 24	1 14	1 34	2 8	2 29
M	26	1 57	2 18	9 41	9 58	1 53	2 12	2 43	3 [illegible]
Tu	27	2 30	2 50	10 15	10 31	2 31	2 51	3 22	3 41
W	28	3 18	3 38	10 47	11 4	3 11	3 31	4 0	4 20
Th	29	3 58	4 19	11 24	11 50	3 53	4 17	4 41	5 4
F	30	4 42	5 10		0 22	4 40	5 21	5 [illegible]	6 [illegible]
S	31	5 41	6 [illegible]	0 50	1 [illegible]	5 [illegible]	6 41	6 [illegible]	7 12

Week Day.	Month Day.	Queenstown. A.M.	Queenstown. P.M.	Kingstown. A.M.	Kingstown. P.M.	Londonderry. A.M.	Londonderry. P.M.	Brest. A.M.	Brest. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
Th	1	11 40	—	5 46	6 16	3 5	3 35	10 38	11 12
F	2	0 12	0 45	6 46	7 17	4 3	4 30	11 47	—
S	3	1 21	1 56	7 48	8 19	4 56	5 20	0 22	0 54
S	4	2 28	2 57	8 49	9 17	5 44	6 7	1 24	1 51
M	5	3 23	3 46	9 43	10 5	6 30	6 51	2 15	2 36
Tu	6	4 8	4 28	10 23	10 41	7 12	7 32	2 55	3 14
W	7	4 48	5 7	10 59	11 17	7 51	8 10	3 33	3 52
Th	8	5 26	5 45	11 34	11 51	8 27	8 42	4 10	4 28
F	9	6 2	6 19	—	0 8	8 57	9 12	4 45	5 1
S	10	6 36	6 53	0 25	0 42	9 27	9 43	5 17	5 34
S	11	7 10	7 28	1 0	1 19	10 0	10 17	5 51	6 9
M	12	7 46	8 5	1 38	1 57	10 36	10 56	6 27	6 46
Tu	13	8 24	8 43	2 17	2 38	11 18	11 48	7 6	7 27
W	14	9 3	9 23	3 0	3 23	—	0 12	7 50	8 13
Th	15	9 45	10 10	3 47	4 14	0 48	1 17	8 37	9 4
F	16	10 38	11 12	4 44	5 17	1 53	2 33	9 34	10 9
S	17	11 50	—	5 51	6 26	3 10	3 44	10 49	11 30
S	18	0 29	1 12	7 2	7 39	4 17	4 48	—	0 12
M	19	1 54	2 32	8 16	8 52	5 17	5 46	0 51	1 27
Tu	20	3 6	3 37	9 26	9 56	6 16	6 43	1 58	2 27
W	21	4 6	4 34	10 22	10 46	7 11	7 38	2 54	3 20
Th	22	5 1	5 27	11 10	11 34	8 3	8 26	3 46	4 11
F	23	5 52	6 14	11 57	—	8 48	9 8	4 35	4 57
S	24	6 35	6 56	0 20	0 42	9 28	9 48	5 17	5 37
S	25	7 16	7 36	1 4	1 25	10 7	10 26	5 57	6 17
M	26	7 56	8 16	1 46	2 7	10 46	11 6	6 37	6 57
Tu	27	8 33	8 51	2 28	2 49	11 [illegible]	11 56	7 17	7 37
W	28	9 10	9 29	3 10	3 32	—	0 25	7 58	8 19
Th	29	9 49	10 14	3 54	4 21	0 55	1 27	8 42	9 6
F	30	10 46	11 21	4 52	5 25	1 [illegible]	2 42	9 41	10 18
S	31	11 [illegible]	—	5 50	6 [illegible]	[illegible]	[illegible]	10 37	11 [illegible]

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add*, – *sub.*), to the time of high water on the given day at the port of reference, you ave the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
erdeen	−1 17	Leith
erystwyth	−3 52	Liverpool
lerney	+2 59	Brest
twerp	+5 13	Dover
roath	−0 42	Leith
reachon	+0 50	Brest
rklow	−2 25	Kingstown
yr	−0 18	Greenock
anff	−1 49	Leith
ntry harbour	−1 14	Queenstown
rnstaple bridge	−0 26	Weston-s.-Mare
onne	−0 2	Brest
chy head & Rye bay	+0 8	Dover
umaris	−0 51	Liverpool
lfast	+2 42	Londonderry
wick	−1 5	N. Shields
th	−0 8	N. Shields
rdeaux	+3 3	Brest
logne	+0 13	Dover
dport	+0 22	Devonport
tol & King Road	+0 19	Weston-s.-Mare
iz	−2 2	Brest
ernarvon	−1 56	Liverpool
lais	+0 37	Dover
mpbellton	−0 23	Greenock
rdiff	+0 2	Weston-s.-Mare
rdigan bar	−4 22	Liverpool
ngford bar	−0 10	Kingstown
hatham	−0 47	London
erbourg	+4 2	Brest
ieraine	−1 37	Londonderry
quet Road	−0 23	N. Shields
rdouan Tower	−0 10	Brest
wes (West)	−0 27	Dover
nan	+4 41	Greenock
omarty	−2 21	Leith
artmouth	+0 33	Devonport
eal & Downs	+0 3	Dover
ieppe	+7 19	Brest
naghadee	+0 3	Kingstown
onegal harbour	+0 17	Queenstown
uglas & Ramsay	−0 11	Liverpool
blin bar	+0 2	Kingstown
ndalk	−0 16	Kingstown
ngeness	−0 27	Dover
nkerque	+0 56	Dover
mouth	+0 38	Devonport
lmouth	−0 46	Devonport
camp	+6 57	Brest
rrol	−0 47	Brest
mborough head	−1 59	Hull
etwood	−0 12	Liverpool
kestone	−0 5	Dover
wey	−0 29	Devonport
ning	+1 42	Dover
lway bay	−0 26	Queenstown
braltar	−1 27	Brest
asgow (Port)	+0 10	Greenock
oucester	+2 51	Weston-s.-Mare
anville	+2 26	Brest
avesend	−0 48	London
imsby (Great)	−0 53	Hull
ernsey (St. Peter)	+2 50	Brest
rtlepool	+0 5	N. Shields
rwich	−1 52	London
vre	+6 4	Brest
eligoland	+0 21	Dover
lyhead	−1 12	Liverpool
oly Island harbour	−0 53	N. Shields
onfleur	+5 42	Brest
verness	−1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 13	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 43	London
Youghall	+0 13	Queenstown

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, *High Holborn, London, W.C.:* 6, *Lord Street, Liverpool; and* 10, *Erskine Street, Leicester.*

ENGLISH (APPLICATIONS).

2111. William Henry Daniels, Crouch Hill, London. "A new or improved screw-propeller."

2175. John Miller, Laugholm, Dumfries. "Improvements in and relating to air-pumps, or machinery for drawing air out of or ventilating buildings, ships, mines, and other structures or confined spaces, applicable in part to blowing engines."

2178. William Cowell Brown, Sheffield. "Improvements in and connected with apparatus for raising vessels and other bodies, parts of which are applicable to other purposes."

2180. George Wilhelm Cabjolsky, Charlottenburg, near Berlin. "An improved mode of, and apparatus for, ascertaining the effective pressure of screw-propellers."

2182. John Louis Lay, Paris, France. "Improvements in apparatus for facilitating the control and operation of torpedo boats." (A communication.)

2250. Charles W. King, Manchester, and Alfred Cliff, Forest Gate, Essex. "Improvements in and relating to steam steering-engines and their valve gear, for ships and navigable vessels."

2251. Alfred Fildes, Lakeside, Ulverston. "Improvements in the construction of apparatus used for propelling vessels."

2298. Thomas Bridges Heathorn, Knightsbridge, Middlesex. "Improvements in apparatus for steering ships, vessels, and boats, and for checking their speed."

2312. Charles Frederick Pike, Philadelphia, Pennsylvania, U.S.A. "Improvements in diving-bells, and in electrical and other apparatus to be employed in connection therewith for submarine or subaqueous operations, parts of which apparatus are applicable for other purposes." (A communication.)

2325. John Edwin Atkinson, Greenwich. "Improvements in

methods or appliances for stowing in or discharging torpedoes from torpedo-boats or other vehicles."

2370. James Alfred Boxer, Greenhithe, Kent. "A new or improved mode or means of preventing 'foul-hawse' or twisting of cables, whereby ships or vessels are moored, and of 'clearing hawse,' or clearing, or separating cables that have become foul or intertwisted, and apparatus therefor."

2375. Patrick Clarke, South Shields. "Improved arrangement to be adopted in ships carrying grain cargoes for better ensuring safety thereof."

2392. Duncan McGregore, Liverpool. "Improvements relating to the mariners' compass, and in appliances for adjusting and correcting the same."

2405. Andreas Olsen, Ephraim, Utah, U.S.A. Improvements in the construction of navigable vessels, and in means for propelling the same." (A communication.)

AMERICAN.

226466. John B. Ward, San Francisco, California.

226931. Timothy Rose, Cortlandville, New York. "A canal-boat propeller."

226999. William P. Hale, Brockport, New York. "A paddle-wheel."

227245. Gordon W. Hall, Havana, New York. "A propeller for canal boats."

227323. Richard H. Tucker, New York. "Pneumatic propulsion of canal boats."

227491. Thomas J. Coulter, Elizabeth, New Jersey. "A sculling propeller for boats."

227544. Henry P. Kirkman, New York. "An elevator for loading and unloading cattle on shipboard."

227595. Thomas B. Taylor, Mount Meigs. "A machine for deepening river channels."

228126. James R. Shackleton, Brooklyn, New York. "A mast or standard for vessels, &c."

BELGIAN.

51449. T. MacCarter and T. Cooper. "Improvements in the construction of steamships or vessels."

CANADIAN.

10746. Henry Brown, Frederick W. Wagener, and George A. Wagener, Charleston. "Improvements in apparatus for ringing alarm bells or buoys."

10932. The Huston Ships' Berth Company. "Improvements on berths for vessels."

FRENCH.

134153. Hérouf. "Propelling boats."

134157. Migeot and Gaston, Bride. "A hand apparatus for propelling carriages and light boats."

134158. Migeot and Gaston, Bride. "A hand apparatus for propelling carriages and light boats."

134159. Migeot and Gaston, Bride. "A hand apparatus for propelling carriages and light boats."

134172. Coppin. "Improvements in the construction of ships."

134202. Stone. "Submarine operations and apparatus belonging thereto."

134315. Wilson. "Improvements in steam engines for steering vessels."

134383. Boisson. "A hand screw motion for propelling pleasure and other boats."

134397. Parks. "Improvements in ships' berths."

ITALIAN.

37. J. J. Kunstadter, London. "Propelling and steering vessels."

70. A. Ferroni, Mantua, and A. Osimo, Ancona. "A screw-propeller for vessels."

86. L. J. Guano, Genoa. "Armour-plated vessels for great speed."

SWEDISH.

246. J. J. Kunstadter. "Steering and propelling vessels and apparatus belonging thereto."

253. J. W. Malmberg. "A life-buoy."

269. C. A. Mc Evoy. "A torpedo apparatus."

PATENTS PUBLISHED.

4236. October 10, 1879. Price 6d. Leopold Kuechen, Robert Keuchen, and Alphons Kuechen, all of Bielefeld, Prussia. (A communication.) This consists of an apparatus wherein the movement of a hand lever at the officer's station is made to bring a pointer at such station to the desired steering order on a dial and at the same time, by means of connecting rods, to bring a pointer at the helmsman's station to the corresponding order on another dial, such apparatus being furthermore so arranged that the helmsman, in moving the rudder in obedience to such order, brings two other pointers, situated at his own station and at the officer's station, into position coinciding with the position of the first-named pointers.

Loading and Unloading Ships.

4282. October 22, 1879. Price 6d. William Rennie, Newry, Ireland. This consists in an apparatus or means for automatically converting a vertical motion into an inclined motion or an inclined motion into a vertical motion of the matters to be conveyed, the whole resulting from the simple and continuous winding or unwinding of a rope under the control of an attendant.

Signals on Ships.

4298. October 22, 1879. Price 8d. Frank R. Francis, Hatton Garden, Middlesex. This consists in the arrangement of an instrument containing a series of commutators, in number corresponding to the signals employed in connection with insulated copper wires for communication between the officer on deck and the helmsman and engineer in charge of the engines, and arranged so that each key or commutator is capable of providing one signal only, and that each key when depressed causes the transmission of either a positive or negative current, and thereby gives instantly, and by means of electricity, orders and instructions for the navigation of the ship or vessel and receives replies to such orders and instructions.

CANADIAN.

10746. Henry Brown, Frederick W. Wagener, and George A. Wagener, Charleston. "Improvements in apparatus for ringing alarm bells or buoys."

10932. The Huston Ships' Berth Company. "Improvements on berths for vessels."

FRENCH.

134153. Hérouf. "Propelling boats."

134157. Migeot and Gaston, Bride. "A hand apparatus for propelling carriages and light boats."

134158. Migeot and Gaston, Bride. "A hand apparatus for propelling carriages and light boats."

134159. Migeot and Gaston, Bride. "A hand apparatus for propelling carriages and light boats."

134172. Coppin. "Improvements in the construction of ships."

134202. Stone. "Submarine operations and apparatus belonging thereto."

134315. Wilson. "Improvements in steam engines for steering vessels."

134383. Boisson. "A hand screw motion for propelling pleasure and other boats."

134397. Parks. "Improvements in ships' berths."

ITALIAN.

37. J. J. Kunstadter, London. "Propelling and steering vessels."

70. A. Ferroni, Mantua, and A. Osimo, Ancona. "A screw-propeller for vessels."

86. L. J. Guano, Genoa. "Armour-plated vessels for great speed."

SWEDISH.

246. J. J. Kunstadter. "Steering and propelling vessels and apparatus belonging thereto."

253. J. W. Malmberg. "A life-buoy."

269. C. A. Mc Evoy. "A torpedo apparatus."

PATENTS PUBLISHED.

4236. October 10, 1879. Price 6d. Leopold Kuechen, Robert Keuchen, and Alphons Kuechen, all of Bielefeld, Prussia. (A communication.) This consists of an apparatus wherein the movement of a hand lever at the officer's station is made to bring a pointer at such station to the desired steering order on a dial and at the same time, by means of connecting rods, to bring a pointer at the helmsman's station to the corresponding order on another dial, such apparatus being furthermore so arranged that the helmsman, in moving the rudder in obedience to such order, brings two other pointers, situated at his own station and at the officer's station, into position coinciding with the position of the first-named pointers.

Loading and Unloading Ships.

4282. October 22, 1879. Price 6d. William Rennie, Newry, Ireland. This consists in an apparatus or means for automatically converting a vertical motion into an inclined motion or an inclined motion into a vertical motion of the matters to be conveyed, the whole resulting from the simple and continuous winding or unwinding of a rope under the control of an attendant.

Signals on Ships.

4298. October 22, 1879. Price 8d. Frank R. Francis, Hatton Garden, Middlesex. This consists in the arrangement of an instrument containing a series of commutators, in number corresponding to the signals employed in connection with insulated copper wires for communication between the officer on deck and the helmsman and engineer in charge of the engines, and arranged so that each key or commutator is capable of providing one signal only, and that each key when depressed causes the transmission of either a positive or negative current, and thereby gives instantly, and by means of electricity, orders and instructions for the navigation of the ship or vessel and receives replies to such orders and instructions.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
218	English Channel—Anvil Point	Proposed new light in 1881.
219	England—West Coast—South Stack	Alteration of low light.
220	Scotland—Outer Hebrides—Sgeir Vichalea Rock	New beacon.
221	Ireland—East Coast—River Liffey—North Bull Wall	New light.
222	„ West Coast—Arran Islands	Colour of lighthouses altered.
223	North Sea—Jade River—Wangeroog	Fog-signal restored.
224	„ Jutland—Fanö Island—Pakhus Point	Particulars of harbour light.
225	Baltic—Bornholm—Haslo	Particulars of western Mole head light.
226	„ Sweden—South Coast—Utklippor Rocks	Sector of red light introduced.
227	Mediterranean—Balearic Islands—Majorca—Palma	New harbour lights.
228	„ Sardinia—San Pietro Island—Cape Sandalo	Temporary alteration in light.
229	„ Sicily—South Coast—Licata	Non-existence of light and bell-buoy—proposed lighthouse.
230	„ Adriatic—Sabbioncello Channel—Orebich	Alteration of Mole head light.
231	„ Turkish Coast and Islands	Various new lights.
232	Black Sea—Asia Minor—Sinoub Boztepeh Point	Alteration in light.
233	Persian Gulf—Arabian Coast—Ras Matbakh	Shoal patches discovered.
234	Eastern Archipelago—Java—Fourth Point	Time-signals.
235	„ „ „ Batavia	Time-ball.
236	„ „ „ Sourabaya	Time-signal.
237	„ „ „ Batavia Road	Position of reef N.E. of Dapoer islet.
238	„ „ Madura Strait—Pasuruan	New harbour light.
239	„ „ Borneo—South Coast	Reported sunken danger.
240	China—East Coast—Amoy Outer Harbour	Light-vessel marking wreck withdrawn.
241	Australia—East Coast—South Solitary Island	New light.
242	South Australia—Lacepede Bay—Kingston	New light on jetty.
243	United States—Pacific Coast—Point-no-Point	New fog-bell.
244	Central America—San Salvador—Libertad	Light only for mail steamers.
245	West Indies—Jamaica—Port Royal Harbour	Buoyage of South Channel.
246	„ Santo Domingo—South-East Coast	Reported sunken danger.
247	„ Bahama Islands—Picquet Rocks	New beacon.
248	United States—Gulf of Mexico—South-West Pass and Pass à Loutre	Fog-signals discontinued.
249	„ Florida—Alligator Reef	Change of character in light.
250	„ „ American Shoals, Florida Reefs	New light.

Monthly Abstract of Nautical Notices—*continued.*

No.	Place.	Subject.
251	United States—Long Island Sound—Stratford Shoals	New fog-signal—Daboll trumpet.
252	Canada—Gulf of St. Lawrence—Chaleur bay—Carleton Point	Colour of light altered.
253	" River St. Lawrence—Origneaux Point	Colour of light altered.
254	" " Algernon or South Rock	New light.
255	" " Grondine	Alteration in leading lights.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

218.—English Channel.—*New Lighthouse on Anvil Point nearly midway between Portland and St. Catherine's.*—Early in 1881 there will be exhibited from the lighthouse, now in course of erection on Anvil Point, a powerful *flashing* light. The flash will be shown every 10 seconds at an elevation of 149 feet above high water, and will be visible from N. 77° 30′ E. to N. 85° 30′ W., from a distance of 18 miles. Further particulars will be published in due course.

219.—England.—*West Coast.—South Stack Low Light, North-West Point of Holyhead Island.—Alteration.*—The following alterations will shortly be made in the South Stack Low (occasional) Light, viz.:—Its position will be 195 feet W. by S. of the main lighthouse, and its elevation above high water will be 90 feet instead of 40. When shown, its period of *revolution* will be *one minute*, the same as the main light, instead of 1 minute 30 seconds, and the arc of visibility will be from S. 4° W., round westward to N. 53° E.

220.—Scotland.—*Outer Hebrides.—Sgeir Vichalea Beacon, Vatersay Bay.*—A malleable iron frame *beacon*, with a barrel-shaped top, 20 feet in height, coloured red, and showing about 12 feet above high water, has been erected on Sgeir Vichalea rock, Vatersay bay, Vatersay island, near the southern end of the Outer Hebrides.

221.—Ireland.—*East Coast.—River Liffey Entrance.—Intended*

Occulting Light on North Bull Wall.—On 11th August, 1880, a light will be exhibited from a lighthouse recently erected on the extremity of North Bull wall, about 330 yards northward of Poolbeg lighthouse. It will be an *occulting white* light; that is, showing *bright* for *ten seconds*, and eclipsed for *four seconds;* elevation 50 feet above high water. Also, on 11th August, 1880, Poolbeg light (fixed white) will be intensified to seaward.

222.—IRELAND.—*West Coast.—Arran Islands, North and South, Galway Bay.—Alteration in Colour of Lighthouses.*—In accordance with previous Notice (1879), the following alterations have been made. Arran Island, North (or Eeragh Island), has been changed from stone colour to white, with two horizontal red belts round the shaft of Tower. Arran Island, South (or Inisheer Island), has been changed from stone colour to white, with one broad red belt 28 feet in width round the shaft of Tower.

223.—NORTH SEA.—*Jade River.—Wangeroog Island Fog-Signal Restored.*—With reference to Notice 186, p. 517, the repairs of the machinery having been completed, the fog-signals are again delivered without interruption.

224—NORTH SEA.—*Jutland.—West Coast.—Fanö Island.—Harbour Light on Pakhus Point.*—A harbour light (established in 1878) is exhibited from a post on Pakhus point, about 824 yards northward of the harbour pier at Nordby, north-east coast of Fanö island. It is a *fixed* light, showing *green* to the northward, *red* to the eastward and *white* to the southward; elevated 13 feet above high water, and visible from a distance of 3 miles. Position, lat. 55° 27′ 10″ N., long. 8° 24′ 50″ E.

Note.—The green light kept in line with the harbour light of Fanö (Nordby) leads to Fanö Lo. This light is not shown when the harbour is closed by ice.

225.—BALTIC.—*Bornholm.—Harbour Light at Hasle.*—Established in 1877, and exhibited from the Western mole head at Hasle, west coast of Bornholm. It is a *fixed* light, showing *red* seaward between the bearings of N.E. and S.E., and *white* over the remaining portion of arc; elevated 24 feet above high water—the red light visible from a distance of 4 miles, the white light from a distance of 3 miles. Position, lat. 55° 11′ 15″ N., long. 14° 42′ 30″ E.

Note.—This light is not exhibited during the months of May, June, and July.

226.—BALTIC.—*Sweden.*—*South Coast.*—*Utklippor Rocks Light.*—*Sector of Red Light.*—Towards the end of May, 1880, a sector of *red* light would be shown between the bearings of S. 11½° E. (through south) and S. 69½° W. from Utklippor (Utklippan or Utklipporna) rocks lighthouse.

227.—MEDITERRANEAN.—*Balearic Islands.*—*Majorca.*—*Palma.*—*Harbour Lights on Mole.*—On 15th May, 1880, the light previously shown from the extremity of the mole at Palma was discontinued; and in lieu thereof a light was provisionally exhibited from a lighthouse situated about 200 yards farther seaward, at the present extremity of the masonry of the works in progress, and which is being extended in a W.S.W. (*true*) direction. It is a *fixed red* light, elevated 35 feet above the sea, and visible from a distance of 4 miles. The lighthouse, 11 feet high, is white and in the shape of an octagonal truncated pyramid.

Note.—This light will be moved outwards as the masonry of the mole is extended. The outer extremity of the works in progress (now projecting 306 yards) is marked as heretofore by a *green* light shown from a pole, visible 1½ mile.

228.—MEDITERRANEAN.—*Sardinia.*—*South-West Coast.*—*San Pietro Island.*—*Temporary Alteration in Cape Sandalo Light.*—On 12th March, in consequence of damage to the lighthouse, a *fixed* light was exhibited on cape Sandalo, western point of San Pietro island, and will continue to be exhibited until the machinery of the intermittent light is repaired.

229.—MEDITERRANEAN.—*Sicily.*—*South Coast.*—*Licata.*—*Non-Existence of Light and Bell Buoy.*—The light formerly shown from the mole at Licata does not exist; it is intended to construct a lighthouse from which a more powerful light will be exhibited instead. The bell buoy formerly placed to mark the pier in course of construction at Licata, has disappeared.

230.—MEDITERRANEAN.—*Adriatic.*—*Sabbioncello Channel.*—*Orebich (Orebiccio).*—*Re-Exhibition of and Alteration in Mole Head Light.*—The light is now *fixed red*, instead of green as formerly.

231.—MEDITERRANEAN.—On 1st June, 1880, the following lights will be exhibited :—

(1.) *Adriatic.—Coast of Albania.—Lights on Samana Point.*—Two lights at the extremity of Samana point (low), near Semeni river entrance. They will be *fixed white* lights, placed vertically; the upper light elevated 52 feet above the sea, and visible from a distance of 10 miles. Position approximate on chart, lat. 40° 47′ N., long. 19° 20′ E.

(2.) *Saloniki Bay.—Light-Vessel at Extremity of Vardar Bank.*—A light-vessel, painted red, moored at the extremity of Vardar bank (off Vardar river, the west side of entrance to Saloniki bay), from which vessel two lights will be exhibited. They will be *fixed red* lights, placed vertically; the upper light elevated 49 feet above the sea, and visible from a distance of 8 miles.

Note.—Vardar bank bears from cape Kara lighthouse W.N.W., distant 2½ miles.

(3.) *Roumelia.—South Coast.—Revolving Light at Dédéagatch*—Exhibited westward of the town of Dédéagatch, about 220 yards from the entrance to the inner harbour. It is a *revolving* light, revolving *every thirty seconds*, elevated 115 feet above the sea, and visible from a distance of 18 miles. Position approximate on plan, lat. 40° 50′ N., long. 25° 55′ E.

232.—BLACK SEA.—*Asia Minor.—North Coast.—Sinoub Sinope.—Alteration in Character of Boztepeh Point Light.*—On 1st June, 1880, the *fixed red* light will be discontinued, and in place thereof a *fixed white* light exhibited, visible from a distance of 12 miles.

233.—PERSIAN GULF.—*Arabian Coast.—Shoal Patches off Ras Matbakh.*—Between the parallels of 25° 41′ N. and 25° 47′ N., and fully 6 miles off shore in the neighbourhood of Ras Matbakh, a series of shoal patches were observed from H.M.S. *Beacon.* These shoals had apparently 4 or 5 five feet water on them and from 16 to 20 feet inside; they are easily seen during daylight; and the lead gives plenty of warning. The positions are approximate, there being no well-defined objects on shore by which they could be accurately fixed.

234.—EASTERN ARCHIPELAGO.—*Java.—West Coast.—Time Signal at Fourth Point.*—On 1st June, 1879, a time signal was

established at Fourth point (close to the shore and 35 yards N. by W. of the lighthouse), eastern side of Sunda strait. The time signal, 69 feet high, consists of three circular discs, revolving on a horizontal axis, and is shown from a frame-work above a circular stone tower 49 feet high, painted white. These three discs—facing respectively north-east, north-west, and south-west—are inclined at an angle of 45° five minutes before the signal is given, placed vertical at two minutes, and fall into a horizontal position at noon, mean time at Fourth point—equivalent to $16^{h.}\ 56^{m.}\ 30^{s.}$ Greenwich mean time. Position of tower, lat. 6° 4′ 17″ 8 S., long. 105° 52′ 30″ E. If a vessel should ask for time by means of the International Code of Signals, the time when the signal will be given will be hoisted on a flagstaff near the time signal tower, using the International Code.

Note.—Communications relative to the working of this time signal should be addressed to the Marine Department at Batavia.

235.—EASTERN ARCHIPELAGO.—*Java.—North Coast.—Batavia.—Particulars of Time Ball.*—The time signal, about 69 feet high, consists of a black disc, 7 feet in diameter, and is shown from a support above a building on the west side of the inner part of the harbour. The signal is made twice daily, except on Sundays and fête days, as follows:—The disc is inclined at an angle of 45° five minutes before the signal is given, placed vertical (the whole visible) at two minutes, and falls into a horizontal postition at noon, mean time at Batavia—equivalent to $16^{h.}\ 52^{m.}\ 47^{s.}\ 5$ Greenwich mean time. The signal is repeated at $1^{h.}\ 7^{m.}\ 12^{s.}\ 5$ Batavia mean time, which corresponds to $18^{h.}\ 0^{m.}\ 0^{s.}$ Greenwich mean time. Position of time signal, lat. 6° 7′ 40″ 1 S., long. 106° 48′ 7″ 5 E. Should the signal fail in accuracy, a flag (blue, white and red horizontal) is hoisted on board the guard ship in the roadstead. Should it not be possible, from any cause, to give the time from the shore, it is occasionally given from the guard ship. Chronometers may be compared in the time signal building.

236. — EASTERN ARCHIPELAGO. — *Java. — North Coast. — Sourabaya.—Particulars of Time Signal.*—The time signal, 39 feet high, consists of four black discs, on the arms of a horizontal cross,

and is shown from a support above a building situated near the new landing pier at the east entrance of the river Kali-Mas. The signal is made daily, except on Sundays and fête days, as follows:—The discs are inclined at an angle of 45° five minutes before the signal is given, placed vertical (the whole visible) at two minutes, and fall into a horizontal position at noon, mean time at Sourabaya—equivalent to $16^{h.}$ $29^{m.}$ $5^{s.}$ 3 Greenwich mean time. Position of time signal, lat. 7° 12′ 10″ 1 S., long. 112° 43′ 40″ 4 E.

Note.—Westward of the time signal there is a circular building with conical roof in which the chronometers are kept, where vessels may have chronometers compared.

237.—Eastern Archipelago.—*Java.—North Coast.—Batavia Road.—Position of Reef North-Eastward of Dapoer Islet.*—A reef (*Karang Tanda Goenong*) of small extent, with a least depth over it of 3¾ fathoms, lies N.E. ½ E. from Dapoer islet, distant one mile—and south-west of this shoal at the distance of 328 yards there is another reef also of small extent, the depth over which is 3 fathoms.

238.—Eastern Archipelago.—*Madura Strait.—Harbour Light at Pasuruan.*—Exhibited from an iron structure on the west side of Pasuruan (Pasoeroean) river entrance. It is a *fixed white* light, elevated 52 feet above high water, and visible from a distance of about 8 miles. Position, lat. 7° 37′ 30″ S., long. 112° 55′ 5″ E.

239.—Eastern Archipelago. — *Borneo. — South Coast. — Reported Sunken Danger South-west of Cape Salatan.*—This danger (*Vanadis shoal*) reported by the master of the Netherlands barque *Vanadis*, is stated to be 54 yards in extent, with a depth of 15 feet over it. Position as given, lat. 4° 28′ S., long. 114° 11¼′ E.; about 34 miles south-westward of cape Salatan (Syita).

240.—China.—*East Coast.—Amoy Outer Harbour.—Light-Vessel Marking Wreck Withdrawn.*—The wreck having been blown up, the light-vessel has been withdrawn. (See No. 168, p. 426.)

241.—Australia.—*East Coast.—Light on South Solitary Island.*—With reference to Notice in 1879, on the exhibition of a temporary light from the flagstaff on South Solitary island, pending the establishment of a permanent light, on 15th March, 1880, the

temporary light was discontinued, and the permanent light exhibited. It is a *revolving white* light, with intervals of *thirty seconds*, elevated 192 feet above high water, and visible from a distance of 19 miles. The lighthouse, 40 feet high, is situated on the summit of the island. Position, lat. 30° 11′ 50″ S., long. 153° 17′ 15″ E.

242.—SOUTH AUSTRALIA.—*Jetty.—Light at Kingston, Lacepede Bay.*—On and after the 15th day of July, 1880, a *bright fixed* light will be exhibited from the sea-end of the new Iron Pile Jetty at Kingston; elevation, 25 feet above high water and visible 9 miles.

243.—UNITED STATES.—*Pacific Coast.—Washington Territory.—Fog-Bell at Point-no-Point Light-Station.*—On and after May 1, 1880, there will be sounded during thick and foggy weather at Point-no-Point Light-station, Western-side of Admiralty Inlet, a fog-bell, struck by machinery at intervals of *ten seconds*. The bell-tower is located on the outer end of the spit.

244.—CENTRAL AMERICA.—*San Salvador.—Libertad Light.—Time of Exhibition.*—The light (fixed white) at Libertad, consists of an ordinary lantern, and is only exhibited when mail steamers are expected.

245.—WEST INDIES.—*Jamaica.—Approaches to Port Royal Harbour.—South Channel.—Alterations in Buoyage.*—The following additions and alterations have been made:—

(1.) A buoy with cage, painted red and white in vertical stripes, is now moored on Three-fathom bank; it bears S.S.W. ¾ W. from Portuguese shoal buoy, distant 7½ cables.

(2.) A small beacon, pyramidal in shape and painted red, has been placed on the south-west extreme of the coral patch (awash) lying N.N.W. ½ W. distant 2 cables from Drunkenman cay—the buoy that previously marked the patch has been removed.

(3.) The north-west extreme of West Middle shoal is now marked by a buoy, painted red.

Note.—Approaching Port Royal by the East channel—Gun cay being wooded is visible from a considerable distance; but Rackum cay, now about 2 feet above water can only be seen on nearing the harbour. *Variation*, 4° *E.*

246.—West Indies.—*Santo Domingo.—South-East Coast.—Reported Sunken Danger South-West of Saona Island.*—This danger, on which the Spanish brigantine *Arina* drawing 9 feet is stated to have struck on 24th November, 1879, is reported by the master of that vessel as having about 10 feet over it, no change in the colour of the water in the vicinity was apparent, and immediately after striking, bottom was not reached with 23 fathoms of line. The assumed position is in about lat. 18° 8′ N., long. 68° 52′ W., about 9 or 10 miles south-west of Saona island. *Variation*, 15¼° *W.*

247.—West Indies.—*Bahama Islands.—Beacon on Picquet Rocks.*—A spar surmounted by a barrel has been placed as a beacon on the northernmost point of Picquet rocks, 3¾ miles northward of Gun cay lighthouse, for guiding vessels to Barnett harbour.

Note.—Vessels of not above 14 feet draught, can find shelter from southerly and westerly winds by standing in on the Great Bahama bank, on an East Course midway between the rock awash northward of Picquet rocks beacon, and Triangle rocks—anchoring in 3 fathoms over clear sand, with Gun cay lighthouse, bearing S. ¾ E. *Variation*, 4½° *E.*

248.—United States.—*Louisiana.—Gulf of Mexico.—South-west Pass and Pass à Loutre Fog-Signals.*—The steam fog-signals which have been maintained at the mouth of Southwest Pass and of Pass à Loutre, Mississippi river, are now *discontinued.*

249.—United States.—*Florida.—Change of Characteristic of Alligator Reef Light.*—On and after July 15, the light displayed from Alligator Reef Lighthouse, Florida Keys, will show every *third* flash *red*, instead of every sixth flash, as formerly.

250.—United States.—*Florida.—Light on American Shoal, Florida Reefs.*—On and after July 15, 1880, a light will be shown from the new structure recently erected on American Shoal between Sombrero key and Sand key. It will light the entire horizon, and is arranged to show a *white flash* every *five seconds*: elevation 110 feet above mean low water, and visible 16 miles. The structure is placed in about 6 feet of water, and 200 feet north-west of Beacon B.; it is an iron frame-work, in the form of a truncated pyramid, resting on a pile foundation. The keeper's dwelling is placed about 38 feet above the water, and a spiral

stairway leads from the dwelling to the lantern. The entire structure is painted dark brown, except the stairway cylinder, which is painted white. Approximate position, lat. 24° 31′ 25″ N., long. 81° 31′ 19″ W.

Bearings and distances of prominent objects :—Sombrero Key lighthouse, E.N.E. ⅛ E., 23 miles ; Sand Key lighthouse, W.S.W. ½ W., 19¾ miles ; Key west lighthouse, W. ⅛ N., 15 miles ; Beacon A, Eastern Sambo Key, W.S.W. ½ W., 8 miles ; Beacon 6, Looe Key, E.N.E. ½ E., 6½ miles.

251.—UNITED. STATES.—*Long Island Sound.—Fog-Signal at Stratford Shoals.*—On and after June 15, 1880, there will be sounded during thick and foggy weather at Stratford Shoals Light-station a Daboll trumpet, operated by caloric engines, giving blasts of six seconds' duration at intervals of 21 seconds.

252.—CANADA.—*Gulf of St. Lawrence.—Chaleur Bay.—Carleton Point Light.—Alteration in Colour.*—On 10th April, 1880, the following alteration was made in the colour of the light exhibited on Carleton (Tracadigash) point, north coast of Chaleur bay :—The fixed red light was discontinued, and in place thereof a *fixed white* light was exhibited, visible from a distance of 11 miles.

253.—CANADA.—*River St. Lawrence.—Origneaux Point Light.—Alteration in Colour.*—On the opening of navigation in 1880, the following alteration was made in the colour of the light exhibited on Origneaux point, right bank of river St. Lawrence :—The fixed red light was discontinued, and in place thereof a *fixed white* light was exhibited, visible from a distance of 10 miles.

254.—CANADA.—*River St. Lawrence.—Light on Algernon or South Rock.*—With reference to Notice in 1879, on the temporary discontinuance of the reflected light on Algernon rock, on 20th April, 1880, a light was exhibited from a lighthouse erected on Algernon or South rock, near Stone Pillar, South Channel, river St. Lawrence. It is a *fixed white* light, elevated 36 feet above high water, and visible from the channel of the river at a distance of 6 miles. The lighthouse 32 feet high and painted white, is square in shape, constructed of wood, and stands on a timber pier. Position as given, lat. 47° 12′ 25″ N., long. 70° 21′ 25″ W.

255.—Canada.—*St. Lawrence River.—Alteration in Grondine Leading Lights.*—During the season of navigation in 1880, the old leading lights at Grondine will be exhibited; and the Upper Range lights (established in 1879) discontinued, until final arrangements can be made for lighting the new dredged channel. The low light, elevated 25 feet above high water, is situated on the flats about 1¼ mile above Grondine church. Position, lat. 46° 35′ 50″ N., long. 72° 4′ 10″ W. The high light, elevated 60 feet above high water, is situated in the village, E.N.E. from the low light distant 1,350 yards.

Hydrographic Notices recently Published by the Hydrographic Office, Admiralty, 1880.

No. 9.—Africa Pilot, Part III., Notice 4; information relating to east coast of Africa, from St. John river to Lamo bay; also to Comoro islands.

No. 10.—China Sea Directory, Vol. I., Notice 3; information respecting various parts, from reports received between 1878-1880.

No. 11.—Red Sea Pilot, Notice 7; information derived from reports received between 1878-1880.

No. 12.—Bay of Bengal, Notice 11; information relating to portions of the Bay of Bengal: Orissa, Burmah, Pegu, Tenasserim, Siam, Andaman islands, Ceylon, &c.

OUR OFFICIAL LOG.

Official Inquiries at Home, 1880.

(*This List is completed to the* 18*th of each Month.*)

609. *Ophir*, ship; built at Miramichi in 1872; owned by Mr. J. Myshrall and others; tonnage, 553; Philadelphia to Newry; maize, partly in bags and the rest in bulk; abandoned at sea, March 21, 1880. Inquiry held at Southampton, April 30, 1880.

before Cooksey and Pegler, J.P.; Clarke and Harland, N.A. Casualty did not occur from shifting or improper stowage of cargo. Abandonment justifiable.

611. *Garmouth*, barquentine; built at Garmouth in 1870; owned by James Mill and others; tonnage, 208; Gijon to Valencia; coals; supposed to have foundered at sea. Inquiry held at Aberdeen, May 1, 1880, before Cook and Cadenhead, J.P.; Curling and Ward, N.A. Court held that on leaving port she was in good and seaworthy condition, and that her loss must be attributed either to an explosion of coal gas, collision with some other vessel, or stress of weather.

613. *Para*, s.s.; built at West Hartlepool in 1875; owned by Mr. W. Young, of London; tonnage, 703; Boston to West Hartlepool; general cargo; lost off Cape Sable, Nova Scotia, on February 26, 1880. Inquiry held at Greenwich, April 29, 1880, before Balguy, Judge; Castle and Comyn, N.A. Casualty due to too fine a course being steered when in with the land, the master thereby committing a grave error of judgment, but no neglect or carelessness being evident, the Court did not deal with his certificate.

615. *Watersprite*, barque; built at Whitby in 1854; owned by Mr. J. Lennard and others; tonnage, 330; the Tyne to Malaga; coals; supposed to have foundered at sea. Inquiry held at Newcastle, May 12, 1880, before Scott and Reid, Justices; Anderson and Ward, N.A. Court unable, from evidence adduced, to assign any reason for the vessel not having been heard of since leaving the Tyne.

617. *Nenuphar*, barque; built in Nova Scotia, 1872; owned by Mr. J. Lovitt; tonnage, 846; Baltimore to Londonderry; maize, partly in bulk and the rest in bags; abandoned at sea, March 28, 1880. Inquiry held at Liverpool, May 12, 1880, before Raffles, Stip. Mag.; Castle and French, N.A. Ship not prematurely abandoned; loss due to perils of the seas.

618. *Othere*, barque; built at New Glasgow, Nova Scotia, 1869; owned by Mr. J. Campbell and others; tonnage, 647; the Tees to Philadelphia; pig iron; abandoned at sea, April 3, 1880. Inquiry held at Middlesbrough, May 10, 1880, before

Colman, Judge; Beasley and Ward, N.A. Vessel prematurely abandoned. Master's certificate suspended for six months; recommended for one as mate during suspension.

620. *Harriet McBeath*, barque; built at St. John's, N.B., 1864; owned by Sir A. E. Bellingham; tonnage, 337; St. John's to Gloucester; timber; supposed to have foundered at sea. Inquiry held at Dublin, May 15, 1880, before O'Donnell, Judge; Curling and Wilson, N.A. Court assumed, in the absence of positive evidence, that the vessel foundered through stress of weather.

622. *Lebanon*, ship; built at St. John's, N.B., 1870; owned by Messrs. Robertson and others; tonnage, 889; Troon to Montreal; pig iron; abandoned at sea, April 17, 1880. Inquiry held at Liverpool, May 17, 1880, before Raffles, Stip. Mag.; Hight and Foster, N.A. Abandoned in consequence of the leaky state of the vessel, brought about by the improper stowage of the cargo. Master not before the Court.

625. *Snaresbrook*, barque; built at Sunderland, 1855; owned by Mr. J. Hodgson and others; tonnage, 411; Doboy to United Kingdom; timber; abandoned at sea, March 23, 1880. Inquiry held at Sunderland, May 22, 1880, before Booth and Scott, Judges; Comyn and Anderson, N.A. Loss occasioned by exceptionally heavy weather, aggravated, perhaps, by the imprudence of the master in carrying a deck load.

626. *Alnwick Castle*, s.s.; built at Low Walker, 1870; owned by The Northumberland Steam Shipping Company; tonnage, 1,170; Cardiff to Havre, and thence to Hamburg; coals and general cargo; took fire and subsequently stranded at Hamburg, April 11, 1880. Inquiry held at Tynemouth, May 20, 1880, before Spence and Swan, Justices; Ward and Parfitt, N.A. No evidence adduced to satisfy the Court as to actual cause of fire, but probably originated from the cargo shipped at Hamburg in the after 'tween-decks.

628. *Alaska*, barque; built at Rollo Bay, Prince Edward's Island, 1869; owned by Mr. W. R. Cruickshank; tonnage, 334; New York to Sligo; Indian corn, meal, &c; supposed to have foundered at sea. Inquiry held at Glasgow, May 25, 1880, before Robertson and Miller, Justices; Murdoch and French, N.A.

Vessel went to sea in a good and seaworthy condition. No evidence adduced as to the cause of loss.

630. *Magdala*, s.s.; built at Hull, 1868; owned by The Moss Steamship Company; tonnage, 1,358; Alexandria to Liverpool; general cargo and passengers, &c.; struck by a heavy sea, which swept a portion of the deck fittings overboard, and occasioned loss of life. Inquiry held at Liverpool, May 28, 1880, before Raffles, Stip. Mag.; Powell, Hight, and Castle, N.A. Casualty due to the heavy sea running at the time. No blame attached to master or officers.

631. *John Kerr*, ship; built at Port Glasgow, 1873; owned by Mr. A. Lyle; tonnage, 1,782; Middlesborough to Calcutta; coal, coke and iron; supposed to have foundered at sea. Inquiry held at Middlesborough, May 26, 1880, before Coleman, Judge; Pickard and Wilson, N.A. Ship went to sea in a perfectly seaworthy condition. No evidence as to cause of loss.

636. *Acme*, ship; built at Quebec, 1847; owned by Charles Hill and Sons; tonnage, 1,119; Bristol to Quebec; ballast; abandoned at sea, April 17, 1880. Inquiry held at Bristol, June 3, 1880, before Baker and Wall, Justices; Clarke and Harland, N.A. Abandoned consequent upon springing a serious leak in her bows which could not be got at, and from the pumps becoming choked with ballast. Court recommended that ballast of the same description should not again be put on board foreign-going vessels.

Official Inquiries Abroad.

608. *Quebec*, s.s.; stranded on East Point, Prince Edward Island, September 2, 1879. Inquiry held at Quebec, January 31, 1880. Master displayed negligence and want of proper care and caution. Certificate suspended for three months.

612. *Syria*, s.s.; abandoned at sea, April 4, 1880. Naval Court held at New York, April 12, 1880. No blame attached to master or officers, but conduct of crew deserving of severe censure in failing to second the master's efforts to save the ship.

614. *Henrietta*, schooner; lost when entering the river at Shoalhaven, February 4, 1880. Inquiry held at Sydney, March 8,

1880. Master to blame for attempting the port at an unfavourable time. Certificate suspended for three months.

616. *Jabberwock*, s.s., and *Redbank*, s.s.; in collision in the Brisbane River, February 19, 1880. Inquiry held at Brisbane, March 5, 1880. Master of *Jabberwock* cautioned to pay more attention in future to the rules laid down for river navigation.

619. *Hieronimus*, brig; lost in the Yangtse River, February 28, 1880. Naval Court held at Shanghai, March 23, 1880. Master censured for not having kept the lead going.

621. *Gwalia*, ship; lost on a reef near Leema Islands, February 13, 1880. Inquiry held at Singapore, March 18, 1880. Master free from blame.

623. *Shah Jehan*, s.s.; stranded in Kumbarn Bay, February 6, 1880. Inquiry held at Bombay, February 27, 1880. Master and second officer guilty of careless navigation. Certificates suspended for twelve and three months respectively.

624. *Wyberton*, s.s.; stranded on Wapen Shoal, Batavia Harbour, April 4, 1880. Naval Court held at Batavia, April 10, 1880. No blame attached to master.

627. *Myall*, schooner; abandoned off Newcastle. Inquiry held at Sydney, March 22, 1880. No evidence adduced on which to found a charge against the master.

629. *Spearman*, s.s., and French gunboat, *Forbin*; in collision near Dellys, May 6, 1880. Naval Court held at Algiers, May 6, 1880. In the absence of evidence from the French vessel no decision was arrived at as to which vessel was to blame.

632. *Meteor*, barque; driven on shore in consequence of cable parting. Inquiry held at Sydney, March 22, 1880. Master to blame for having anchored the vessel in an unsafe position. Certificate suspended for three months.

633. *Lansdowne*, ketch; placed in a dangerous position, April 9, 1880. Inquiry held at Newcastle, April 13, 1880. Master severely reprimanded and cautioned to be careful in future.

634. *Gem*, schooner; stranded on the Breakwater at Newcastle, through wheel chains parting, March 12, 1880. Inquiry held at Newcastle, March 24, 1880. No blame attributable to master.

635. *Trelevan Family*, brigantine; lost on a reef in the Solomon Group, January 23, 1880. Inquiry held at Newcastle, March 31, 1880. Master used every means to avoid the catastrophe. Certificate returned.

637. *Sophia*, schooner; stranded on the Bull Rock off Portland Island, January 28, 1880. Inquiry held at Auckland, New Zealand, February 12, 1880. Master to blame for neglecting the lead. Certificate suspended for three months.

638. *Rotomahana*, s.s.; stranded on Paget Rock, Great Barrier Island, January 1, 1880. Inquiry held at Auckland, February 3, 1880. No blame attached to master.

GENERAL.

A "CITY" OF MILLS.

In a recent impression of the *Globe*, the following interesting paragraph appeared:—

"The New York *Tribune* gives a series of computations which put the flour-producing industry of Minneapolis in a very striking and conspicuous light. We ourselves are a good deal interested in these statistics, because within the past two years this busy city has begun to pour its produce into Europe, although lying at no less than thirteen hundred miles from the sea-coast. Europe had last year from Minneapolis nearly 450,000 barrels of flour, and the Americans are anticipating a great development of trade with us. The *Tribune* reckons that there are five-and-twenty flour mills in the place, all of them pretty large, and one or two of them enormous. One of them presents a floorage of nearly 211,000 square feet, and can grind 3,000 barrels of flour a day. Three others have from abont 150,000 to 160,000 square feet of floorage, and the whole twenty-five give a total area of 1,210,764 feet, or nearly thirty acres of ground, all of which is stocked about as full as it very well can be with expensive machinery, the total power of which is represented by nearly 20,000 barrels of flour daily. There is no city in America which has so much capital invested in

this industry, and none which seems more likely to become and to remain the centre of it. The rapidity of its growth may best be shown by the statement that in the year 1860—just twenty years ago—its total produce of flour was 30,000 barrels. In five years from that date it had more than tripled that quantity. In 1870, Minneapolis sent out 193,000 barrels. The next three years witnessed an extraordinary advance, the total output amounting to no less than 585,000 barrels. In 1876 it had reached upwards of one million barrels, and last year this had become 1,551,789, or more than fifty-fold its total nineteen years ago. Several mills are now rapidly building, and it is anticipated that a further enormous increase will be recorded this year. The export trade has hitherto been chiefly confined to Europe, but the success of their two years' enterprise in this direction has so elated the Minneapolis millers that they are eagerly anticipating a development in the direction of the South and West Indian ports. It will be curious to watch the growth of this city of mills, which, though not well situated for exportation, is particularly so for the vast tracts of country in the north-west which are as yet untilled."

This is more important than it at first sight seems. In the first place if wheat is converted into flour before shipment, the carrying of husk and so forth is saved; that is better for the consumer in England. In the second place flour is always carried in bags or barrels; that will be satisfactory to Mr. Plimsoll and his following. The only persons who will not like it are the English millers, but we presume that their interest will count as nothing in the endeavour to place in the hands of the maker of bread, pure flour, without the intervention and subsequent cost of "middleman" the miller here.

THE

NAUTICAL MAGAZINE

FORTY-NINTH YEAR.

VOLUME XLIX.—No. VIII.

AUGUST, 1880.

TONNAGE:

AN IMPORTANT SUGGESTION THEREUPON.

IT has again been asserted that the Tonnage Laws contribute to the unseaworthiness of some classes of ships. We think the assertion involves a gross fallacy; but when we find two such authorities as Mr. Nathaniel Dunlop, of the Allan Line, and Mr. Benjamin Martell, the Chief Surveyor of Lloyd's Registry, putting themselves forward as its chief promulgators, we must (though we have hitherto regarded it as nothing short of heresy) ask ourselves, and our readers, to look into the subject once again.

The idea or theory propounded by these gentlemen is, that in "some ships," as Mr. Dunlop says; and "in the ship of the future," as Mr. Martell urges, if an important portion thereof, immediately under the uppermost deck, were but exempted from tonnage admeasurement, even though cattle or passengers, and winches, and gear, and stores, and crew might be carried in the space exempted, the ship would be safe. That such a theory is fallacious, and embodies a proposition outside practical administration, we have shown in our own elaborate articles on the general question of tonnage. We see nothing now to lead us to alter our opinion. We will, however, put our own opinions aside for the

moment, and discuss the proposal of Messrs. Dunlop and Martell. Although we cannot adopt it, it leads to something well worth serious consideration. If it is a fact that the existing tonnage law is (as Mr. Martell and Mr. Dunlop would have us believe), so bad that an exemption from admeasurement under it of even a part of a ship would give increased security to life and property at sea, then as a logical sequence the amount of safety at sea that would accompany the total exemption from admeasurement of every part of every ship would be proportionately greater.

If these two gentlemen are right in their views, then we submit that in the carrying out of their proposal to its legitimate end, which is the abolition of *all* tonnage admeasurement, will be found the remedy against all loss of life at sea, a remedy before which all Mr. Plimsoll's efforts will fall into insignificance. We trust our readers will mark the words of the preceding paragraph. We do not say, as we do not think, that what they propose will have any effect whatever in diminishing loss of life at sea; what we say is that if there be any good in their proposal at all, then it is not by doing such a little thing as they propose, but by doing what is the logical sequence of what they propose, *i.e.*, disestablishing tonnage admeasurement as a State function, that the remedy for loss of life at sea is to be found.

It must be understood that while we think that the course they propose might add to the profits of certain classes of ships at present in existence as well as of "ships of the future," we think that if any thorough alteration is needed in the tonnage laws, it is needed in the direction of adopting the gross tonnage, pure and simple, as the standard of taxation. We regard the tonnage laws so far as they provide for the measurement of gross tonnage as equitable fiscal laws. Tonnage laws should be nothing else; and we maintain that to make them anything else, or to retain them as they are, if they are now anything else, or can be twisted into anything else, is wrong.

To begin our observations we must take the facts as we find them, and deal with them as they are. The first fact that meets us is that "register tonnage," what with deductions for engine-room and coal space, for double bottoms, for crew spaces

and skylights, and "casings," already means nearly nothing as applied to a steamship. This fact leads us to inquire into the purposes for which such a "register tonnage" is needed. Clearly not as a standard on which to compute the carrying capacity of a steamship, for it does not even give an approximation to it; clearly not as indicating any measure of justice in charges between ship and ship, for it is no approximation to such a measure; clearly not for the purpose of charging light dues, for it gives no intimation of the value of the ship or even of her size, and the light dues ought certainly to be based on the value of the venture to which the lights render service; but let us go further, and we shall find that register tonnage is certainly not needed to serve as a basis on which to charge dock dues and quay dues, for it means nothing by way of an indication of the space a steamship occupies in dock or alongside a quay wall. It is clearly not needed for international Suez Canal purposes, as the Canal is of value to a ship according to the square of the length multiplied by the breadth and depth of the ship using it. Is the present register tonnage needed as a standard of comparison of value? No. Is it needed as a measure showing the capacity of a ship? No; for it gives neither an indication of the one nor of the other. Register tonnage is now very nearly an absurdity and quite an injustice. Why then should Mr. Martell and Mr. Dunlop suggest to the Legislature that further inequalities and exemptions should be introduced into it? We trust their efforts may fail, but if they succeed, the tonnage law will then have become so great an absurdity and so unjust and grievous an imposture that it would thereupon in common justice have to be abolished altogether.

Instead of presenting our readers with an article this month, as we had intended, on the subject of bags regarded as a "certain, safe, and effectual" cure for casualties to ships carrying grain, we submit this subject of tonnage for consideration as being more worthy their serious and undivided attention. Shipowners are not all interested in "bags," and the interest of other persons in them is becoming languid, but all shipowners are interested in "tonnage," which in this instance means the "incidence of taxation" on shipping.

Supposing that some system should be devised in lieu of the present sham register tonnage, a supposition by the bye which is rather rash at present in face of the steam shipping interest, what is there that can be substituted for it? Is it to be

(1.) A further exemption, or a further series of exemptions, in favour of certain existing ships, and of the ship of the future, grafted on to the present register tonnage; or—

(2.) The total weight of the water displaced by the ship at her load draught, such load draught to be cut in and painted on the ship, and registered as her registered draught; and the weight of the displaced water as her registered tonnage; or—

(3.) A system whereby the "tonnage" shall mean the dead-weight in tons which a ship can carry between her light draught and her load draught; or—

(4.) Her gross internal capacity; or—

(5.) Some rough and ready means, such as multiplying the extreme proportions together, and dividing by, say 100 or 120; or—

(6.) Shall there be substituted for any and every official "register tonnage;" an official "register value?"

Moorsom's conception of a tonnage law was, that it should give, in cubic feet, the exact internal contents of the hull of a ship, including poops, deck-houses, &c., whatever might be the form of the ship: that is to say, it should be a system which, while it measured all ships accurately, should afford no inducement to shipowners to build ships of any special type, or to exaggerate any one proportion at the expense of the other proportions, or to the detriment of the ship. His gross tonnage does all he intended it should do; but the principle of deductions unfortunately grafted on his rules, to foster what was then a struggling interest, has led to the collapse of his system as now applied. The "struggling interest" we have just referred to was the steam shipping interest.

We will now consider each of the six proposals we have put on record as containing the germs of systems that might possibly supersede the present register tonnage.

1. A further extension of exemptions of spaces under the upper deck. This we dismiss. The remarks we have made above, and the reasons we gave in a recent article on Mr. Martell's paper, are, we think, sufficient to condemn it as being outside the limits of practical administration. But we will add that the shipowner gets a higher freight for cargo carried under cover than when carried on an open deck across the Atlantic; while all arguments in favour of this system are based on the false principle that it is right as well as necessary to bribe an owner to make his ship safe. The crew may think that the contrary view ought to prevail, and that if he does not cover in his ship, when for the safety of the crew it is necessary that she should be covered in, he ought to suffer fine for his omission. That is the other view, and the right one.

2. The weight in tons of all the water displaced by the ship at her load-draught. This system has in its favour a great deal that Moorsom's system possesses. It would, however, give in *tons of weight* for the outside form of the ship what Moorsom's gross tonnage does in *tons of space* for the inside form of the ship. Its advantages would be that it would settle and register the load-line, and that the owner might make the hull of any form, while, also, he might be fancy free in leaving open or inclosing spaces on deck; and whilst there would be no more chances of deductions on any pretence whatever, there would be no room for contentions whether a *space* in a ship is or is not liable to measurement. And if a shipowner might be impelled even then to ask that the weight of the uppermost deck of the ship of the future might be deducted from the tonnage of his ship, he certainly would not have, as he now has, the examples of deductions for engine, and coal, and crew spaces to fall back upon as precedents. As the tonnage of the displaced water would give a higher tonnage than the present register tonnage, the weight tonnage might be divided by a factor which would about bring it to the figure of the present register tonnage. As against this proposal (numbered 2) the shipowner would complain that the tonnage would include the weight of the equipments, engines, boilers, stores, and food, which he would not like included; and both sailing and steamship owners might say that it would

altogether be against the strong, that is to say, the heavy ship, and in favour of the flimsy, that is to say, the light ship; but all systems have some objections.

3. A system whereby the register tonnage shall mean the weight in tons a ship can carry between her light draught and her load draught. The advantage of such a system would be that under this the owner could build his ship and arrange his deck shelter just as he pleased, and that the tonnage would, in tons weight, exactly represent the limit of the weight of cargo that might be carried. The difficulty would be to settle what is meant by the *light* draught. Should it, in the case of a steamer, include the weight of engines, boilers, water in the boilers, ballast tanks full of water, fuel in the bunkers, crew in their places, food for the crew, ships stores, donkey boilers and engines; or should it only include the weight of the hull, masts, spars, rigging, boats and equipments of the ships? Should it, in the case of a sailing ship, include the weight of hull, masts, yards, chain cables, crew, stores, equipment, and ballast? The difficulty is to settle what is meant by the light draught. In one case it might be unjust to the steamer, and in the other unjust to the sailing ship. But if this system is meant to give the tonnage available for cargo only, then it would, in the case of long steamers, be unjust to the dock companies, for it would practically be equivalent to a deduction from the outside size of the ship. This system however would, like the preceding, settle the load-line.

4. The gross tonnage of Moorsom, or internal capacity of the ship, with the modern addition of measuring space on deck occupied by cargo and stores. This is the fairest system all round, and open to the least objection. Let a shipbuilder build how he likes, and when he has built let what he has built be measured, but make no deductions. Credit the owner and the builder with sense enough to be sure they will build what they want, and credit the Government officers with sense enough to know that a shipowner, whatever he may say about philanthropy, will not put an extra deck on his ship if it will not pay him to do so, or if it is not necessary to make his ship safe. If when he has done he can get the space under it exempted, so much should be

placed to the credit of his wit, and so much to the debit of those who are overcome by it. Gross tonnage takes account of internal form, but if it were adopted every deduction of every sort should cease, and we are not at all sure that this is not now necessary in order to foster a "struggling interest"—we refer now to the sailing ship interest.

5. Principal dimensions. If instead of taking internal measurements of a ship and calculating her tonnage space that way, and if instead of ascertaining either the total weight of displaced water, or of the weight carried between the light and the load water-lines, a simple system were adopted of multiplying the principal dimensions into each other, and dividing by 100 or some other factor, then we should reach simplicity itself. The advantage of this proposal is comprised in the word simplicity. There would be no difference between a sailing-ship and a steamship as regards measurement. In this respect, proposals numbers 2, 3, and 5 are alike, and it would lead directly towards encouraging the covering in of the spaces between the poop and forecastle, since that covering in would not increase the depth for measurement. It would not tell as against a strong or heavy ship in favour of a weak, light one; all that can be said against it is, that the nearer a ship's under-water section approached in form a "rectangular prism," the nearer would she be in coming up to the figure representing her tonnage. It might lead to the berthing of the crew below deck, and might encourage the building of full ships.

6. Instead of register *tonnage* let there be a register *value* This seems to be an idea worth consideration. It would certainly not cramp nor harass the shipbuilder or designer. There would be no possibility of any owner making a point of the operation of the Tonnage Laws as cramping him in his business, and as causing danger to life. A register value would be useful for many purposes; it would show what the owner thinks of the value of his ship, and it would prevent disputes on assurance policies; or when one ship has to pay the value of another. As the owner on the one hand would pay light dues on the registered value, he would not put it too high; and, as on the other hand,

he could not recover on a policy or on any claim beyond that value, he would not put it too low. He would on the whole fix a proper sum, but he might fix any sum he chose, subject to appeal to a proper Court by any recipient of dues. The objections to this proposal are not at first sight clear, but the advantages would be manifold, and there would be no injustice between ship and ship and steamship and sailing-ship.

We may now consider the practical questions:

(1.) Some system is needed for assessing light dues. The best basis is value of the venture. Therefore for that purpose proposal No. 6 would answer. We doubt whether any one will object to this assertion.

(2.) Some system is needed for charging rent for dock and quay space. The best basis is length, breadth, and depth, viz., length for quay value, depth for sill and dredging values, and breadth and length for area value. Gross tonnage is the best for this, but next to gross tonnage are the rough and ready standards of proposal 5.

(3.) Some standard is needed for fixing pilotage dues—either draught of water simply, or the rough and ready proposal 5 would answer the purpose.

It is clear, however, that there can be no necessity for the State to interfere or to measure at all, if once the light dues are assessed on value as is the case with all assessed rates and taxes.

Suppose then that instead of patching up a fiscal measure, with an erroneous view that it can be made into a life-saving measure, every attempt on the part of the State to ascertain a ship's tonnage should be abandoned, no one would suffer, and more than this, the following advantages would accrue:—

(*a.*) Ships could be built of any form the owner may please, or the builders may fancy; and the ship of the future can be covered in from stem to stern.

(*b.*) Dock and harbour authorities would be left as free as the shipowner, which is quite fair, and they could reframe their rules on length, breadth, depth of the ship, and the time she remains in dock, charging extra for the use of cranes, elevators, &c., &c., if necessary.

(*c*.) One ship would have no unfair advantage over other ships.

(*d*.) Ships with double-bottoms, &c., &c., and of novel or peculiar internal design, or superstructural arrangement, would not "hedge" the tonnage rules.

(*e*.) Light dues could be levied on value; but light dues are as nothing compared with other dues.

Finally. So long as the aggregate of any dues is not unjustly increased by any alteration made in the direction we have indicated, its only effect would be to make things fair all round, as between ship and ship, and as between dockowner and shipowner, which is certainly far from the case at the present time.

It has never yet been found necessary to ascertain the cubic contents of a house, a factory, or a barn in order to subject it to taxation, and for the same reasons which apply to the taxing of houses, barns, and factories, it is not necessary to ascertain the cubic contents of a ship. Shipowners may find it to be a convenience to them to be furnished with a statement of the cubic space in their ships, but if so that could be done as a trade necessity and for trade purposes by the Register Societies or by themselves: but if there is no necessity for doing it for exclusively State purposes, then there is no reason that we can see why it should be done by the State.

We trust we have fairly and intelligibly put before our readers the issues raised by Mr. Martell and Mr. Dunlop, and other and by far broader and deeper issues.

NAVAL AND MERCANTILE OFFICERS.

IN continuation of the subject briefly treated in the July number of the *Nautical Magazine*, we think it desirable to call attention to a lecture recently delivered by Mr. Laughton, of the Royal Naval College, Greenwich, at the Royal United Service Institution, on "Naval Promotion, Arithmetically and Historically Considered." The scope of this very interesting discourse was somewhat more

extended than the title would seem to imply, and it concluded with a series of suggestions which are well worth very serious consideration. If it be really an ill wind that blows no one any good, we should assuredly have ample reason to curse the moisture-laden breezes which, for several summers past, have swept over the United Kingdom, drowning the farmer's fields, and ruining his hopes, had they not had the effect of directing particular attention to the conditions of our maritime position. The precarious nature of our food supply, and the vast figures of our ocean trade, have at length attracted, if not all the notice they deserve, at all events more than either statesmen or the public have hitherto thought it useful to bestow upon them. It is a healthy symptom of the re-awakened attention to the maritime concerns of the Empire, that proposals are being brought forward with regard not only to the general question of providing for the security of our enormous interests on the seas, but also to particular, though far from unimportant, details of it. It is in this respect that some of Mr. Laughton's suggestions have so strong a claim to be considered by us. Interesting as is the greater portion of his lecture, with its valuable and ample illustrations from those historical sources with which no one has a more intimate acquaintance than the lecturer himself, it is his final suggestions that have their chief importance for us at the present time.

Like other eminent men who have investigated the condition of our naval *personnel*, Mr. Laughton arrives at the conclusion that there is little hope of making it what it should be, unless recourse be had to the assistance of the Merchant Service. Arguing that the present very large numbers on the Lieutenants' List should be reduced to about one-half, he suggests "that this number might be supplemented" by officers who had not qualified for what he calls "the staff," and "still more by officers from the Merchant Service, who, under such conditions as might be decided on, would serve for a commission as sub-lieutenants or lieutenants." That this proposal does not proceed on the assumption of any inferiority on the part of officers so coming from the Mercantile Marine, in either scholastic or seamanlike qualifications, the portion of the lecture immediately following plainly shows. Now it can hardly be disputed that the adoption of some such plan would give, as

Mr. Laughton states, to such young officers "a wider experience in the command of men than they can possibly get on board merchant ships, and would therefore render them efficient as officers of the Mercantile Marine," while it would largely increase the field from which we might draw suitable recruits for the commissioned ranks of the Royal Navy in time of war. It would be difficult at present to say with accuracy what is the true feeling of mercantile officers on the subject. Their brethren of the Navy are certainly without the means of arriving at an exact knowledge of their sentiments in the matter, and in the Merchant Service itself, being so large and so scattered, and the intercourse between its members being so casual and interrupted, it is doubtful if the real state of its public opinion has yet been made known. Under these circumstances it will be not without interest to call attention to the published sentiments of naval officers of high standing, speaking in the presence and under the criticism of their brother officers, and with a full sense of the responsibility which attaches to their utterances. More than four years ago Commodore Wilson, the distinguished senior officer of the Naval Forces on the Australian Station, in a lecture at the United Service Institution, entitled, "Is our Merchant Service any longer a feeder to the Royal Navy?" expressed his conviction that the Naval Reserve should be made "a link between the Royal and the Merchant Navy, and not—as it is now—a gulf which separates them." He lamented the cutting off of the merchant seamen from the Navy, and that "the good feeling which formerly existed between the two branches of the profession"—a phrase to which we may direct particular attention—"is fast vanishing," and that this is extending from the men to their officers. No one in the Navy will need to be told who Commodore Wilson is, and how high the place he holds in the estimation of all who have been brought into contact with him. But though his name must be known to many officers of the Mercantile Marine, it can scarcely be generally familiar to them all, and it may be well to inform them that he is an officer who has served with distinction in all parts of the world, and that he has been no less distinguished by his gallantry in the presence of the enemy, than by the success with which he has conducted

important duties in peace; that he is on the personal staff of the Sovereign; and now holds one of the highest commands which can fall to an officer of his rank. His words therefore have a significance which would not be attributed to those of anyone who might merely casually address himself to the subject. He says: "The time for keeping the Navy a close borough is past; within proper limits we should put our hand to those who, like ourselves, follow the sea; for the ranks of the Merchant Service now hold officers of as good social position as our own, gentlemen both by birth and education." At the last distribution of prizes to the pupils of the schoolship *Conway*, Lord Ramsay, M.P., a naval officer of high reputation, observed that "the Royal Navy, in the event of another great war, would have to depend for aid in a great and increasing degree on the Mercantile Marine." This remark, addressed as it was to an audience largely composed of young officers about to enter the Merchant Service, shows what naval officers of the admirable school represented by Lord Ramsay think in regard to their brother seamen of the commercial service. On the same occasion, Mr. Brassey, who must have been fully alive to the responsibility of his position as a Lord of the Admiralty, dwelt with much earnestness "upon the necessity of the most cordial understanding between the Royal Navy and the Merchant Service." It is, therefore, plain that a large body of officers of the higher ranks in Her Majesty's Navy are persuaded of the advantage that the country would derive from a closer connection between the two services, and, indeed, are convinced that to properly secure our maritime position, a more intimate union between the two is essential. Mr. Laughton's suggestions are in exact accordance with the views expressed by Commodore Wilson and Lord Ramsay, and backed up as they are by arguments drawn from the Naval history of the Empire they should receive careful examination. As he says, "If they—the merchant officers—are fit to officer our ships in time of war," for which very purpose we keep up a Naval Reserve, "they are equally so in time of peace." But the strongest argument in favour of looking to the Merchant Service for recruits for our list of officers, is that "it would be a national gain by bringing the

whole sea-faring interest of the country more into unison with the Navy, and doing away with much of that jealousy which cannot but be a source of weakness." There can scarcely be any folly greater, at a moment when our ocean trade is more than ever important to our wealth, and our very existence as a nation, than leaving out of consideration the fact that we have more sailors than any other country, and "putting this great source of national strength altogether on one side."

The real question, of course, is, how is the union between the Navy and the Mercantile Marine to be brought about? We see that there is an evident desire that it should take place on the part of naval officers; and that it is looked on with favour, indeed "earnestly" dwelt upon as necessary by Lords of the Admiralty. Is the same readiness to be found in the ranks of the merchant service? If so, how is it to be ascertained? With a view to the solution of the question we venture to make a proposal. There are more than a hundred midshipmen on the list of the Royal Naval Reserve; of many of them the seniority is sufficient to entitle them to a step in rank. Why should not the Admiralty offer a small number of temporary commissions as sub-lieutenant for competition, amongst those who could bring satisfactory certificates of conduct and service, and would consent to undergo the examinations which young officers in the Navy have to submit, to obtain the same rank? Of course facilities should be given them to prepare for these examinations, and Greenwich and the *Excellent* should both be open to them for a certain time. The successful might engage to serve for a year or any defined period on board one of Her Majesty's ships, and then return to their places on the list of sub-lieutenants in the Reserve. Some such plan might be tried as a beginning, and the result would indicate how much farther it might be desirable to proceed in the same direction.

HEALTH ADMINISTRATION AND QUARANTINE IN TURKEY.

OUR attention has been directed to this subject by the perusal of a vigorous correspondence in the *Levant Herald*, published at Constantinople. The object of the correspondence is evidently intended to be two-fold—to point out to the general public the importance of practising even the most elementary principles of sanitation, and to apply them to the city and suburbs of Constantinople, which are admitted by all to be in such an unsanitary state as to render it probable that at any time a virulent epidemic may be generated, or that in the event of the contagion of plague or cholera being introduced, it would spread to an alarming extent.

This may be considered a local affair, in which Europe has no concern, least of all England. One writer, however, gives the subject a wider view, and treats of the condition of Constantinople itself as constituting a grave danger to Europe. A consideration of this view we now endeavour to present to our readers.

At Constantinople there exists the largest and most costly Health Administration in the world—an International Sanitary Board—formed on the recommendation of the Cholera Conference of 1865-6, having for its *raison d'être* the protection of Europe from cholera, and, one would naturally suppose, the prevention of other infectious and epidemic diseases arising in the East. This Board of Health is composed of delegates from the different nationalities represented in Turkey, medical and non-medical, paid by their Governments or out of the dues levied on the shipping for purposes of quarantine. It is supposed to constitute a perfect quarantine administration, and has very extended powers. It imposes a tax on all shipping frequenting Turkish ports, to support quarantine stations, which are, or are supposed to be, always in active operation. At Kanak, on the Upper Bosphorus, and at Chanak, in the Dardanelles, the shipping is exposed to the operation of [illegible]s system of quarantine, which may be as perfect as possible

in theory, but which, from this correspondent's view, is anything but perfect. He discusses the theory of contagion, the supposed efficacy of disinfectants, and the other appliances of quarantine (as applied in Turkey), and then concludes that the protection given to Europe is imperfect and simply delusive. One of the weakest points of the system he considers to be the dangerous state of Constantinople itself, and points out that, from its position in the line of quarantine, all external precautions against the spread of plague or cholera must be inefficacious unless an internal quarantine of more perfect sanitation be conjoined. Enough is known of the laxity of the system to assure us that no true process of disinfection can be carried out at any of the stations, and that the general arrangements are so imperfect that, should diseases of this kind be once introduced, any further efforts of quarantine to protect Europe must be considered exceedingly problematical.

It has been shown by this correspondence that, with a very large income derived from the tonnage dues and the fines levied, there is a large yearly deficit, which is properly pointed out to be a certain source of danger. This, he considers, demands enquiry. It is further stated that at Constantinople there is no provision made for the reception of sailors suffering from small-pox, and other infectious diseases, and that the lives of our seamen are exposed to great and unnecessary danger from having to be conveyed long distances on the Bosphorus to the general hospitals, in the very height and crises of such diseases, and he contends that the Health Administration should provide out of the dues sufficient accommodation of floating hospitals for the treatment of such cases. This seems a reasonable enough proposition, considering the distance from any part of the Bosphorus to the hospitals in town, which cannot but be injurious to the sick sailors who have to be transported to them. Such exposure must kill many. But another correspondent, who signs himself "A Member of the Board of Health," whilst admitting the shortcomings of the Administration, contends that this Board exists only for the purpose of dealing with epidemics when they arise, and has nothing whatever to do with preventing their occurrence. This is also the opinion

of other members of the Board. We venture to ask, could this really be the intention, and does the British shipowner, who contributes so largely towards this Health Institution, understand it in this sense?

The last published account of this Administration shows that it possesses an enormous yearly income, and has an equally large expenditure, but it does not show that the money has been spent in the most satisfactory way. A still more recent writer in the same journal states that no less a sum than 19,000 Turkish liras* is spent in salaries for the Central Administration alone, *i.e.*, at Constantinople, which includes the Bosphorus and the Dardanelles, and that this large sum does not include the salary of the Chief Administrator, nor the salaries of the numerous Health delegates, who are paid by their various Governments.

We call attention to this correspondence, as at this moment a Commission is engaged in revising the tariff of the Health Administration, the expensive character of which is justly complained of. And we cannot but confess our astonishment that with such a large income, such an extensive staff, and with such a vast amount of the diseases alluded to, the important part of the most rudimentary quarantine, provision for seamen suffering from small-pox, should be wanting in such an important shipping centre as Constantinople. Whatever view the delegates may hold as to the nature of their functions, we cannot but think that a portion of the large income of this Health Administration should be so applied that the lives of seamen suffering from infectious diseases should not be endangered by removing them in all weathers, up and down the length of the Bosphorus. It is easy to conceive what ill results would follow from removing a patient in the height of the eruptive stage of small-pox.

* Upwards of £17,000.

ASSOCIATION FOR THE REFORM AND CODIFICATION OF THE LAW OF NATIONS.

WE have recently received the Report of the proceedings of this Society for the year 1879. It contains numerous papers of great value, many of especial interest to nautical readers. The discussion of questions affecting the common interests of merchants and navigators of all countries, with a view to bringing such subjects within the range of international law and practice, is most useful, and would be a fertile field for the exercise of some of the shrewdness and nautical learning which distinguish so many of our shipowners and shipmasters.

The next meeting of the Society will take place at the Federal Palace, Berne, the session commencing on the 24th and ending on the 27th of August, and the subjects proposed for discussion are—

I. Public International Law.—Consular Jurisdiction in Oriental Countries. Domicile as regulating Testamentary and Matrimonial Rights. Territorial Rights of Aboriginal Races. On the Status of Foreigners in the Law Courts of the Ottoman Empire. International Protection of Telegraphic Cables under the High Seas.

II. International Commercial Law. — Bills of Exchange. Negotiable Securities (Shares, Bonds, and Coupons, Nominative or to Bearer). Bankruptcy. Copyright. Codification of Commercial Law.

III. International Maritime Law.—General Average. Maritime Insurance. Law of Affreightment.

Miscellaneous Papers and Different Subjects.

All communications in reference to the Conference or the subjects set down for discussion should be addressed at once to the Honorary Secretaries of the Society, 83, Chancery Lane, London, E.C. We hope some of our readers may be induced to go to Berne and support a movement of such obvious utility to navigation and commerce.

ON COMPASSES, AND THEIR ADJUSTMENT IN IRON SHIPS.

I PURPOSE making a few notes on the method of adjusting the compasses of an iron ship, on compasses generally, and on the value of a *deviation* card; not forgetting, finally, to apprise the navigator of the many simple methods by which he may, whenever sun or star is visible, check the error of the compass—on the knowledge of which error the safety of life and property absolutely depends. But before doing so, I think it better to begin with *a brief lesson in elementary magnetism*, for though many readers of the *Nautical Magazine*, as testified by their occasional correspondence, well understand the relation of magnetism to the mariner's compass, and the distribution of magnetism throughout an iron ship, I am sure, and I speak advisedly, that there are many more who have not the slightest acquaintance with the subject.

To begin: ask the optician who repairs your ship's instruments to sell you, for a few shillings, a straight bar-magnet about fifteen inches long, such an one as he uses when adjusting compasses, but *uncased;* also a small magnet about six inches long; if the two ends of these magnets are undistinguishable the one from the other, ask him to put a file-mark on that end of each magnet which would indicate the north of the compass card. Provide yourself with half-a-dozen darning needles, the longest you can get, a handful of iron tacks, a few long iron nails, some steel filings, some short pieces of soft iron and iron wire, a few short lengths of very fine sewing thread or cotton, and an elastic (india-rubber) band, about a quarter of an inch in width. The thread has torsion or twist, but this will be of little account if you *well wax* it; cut

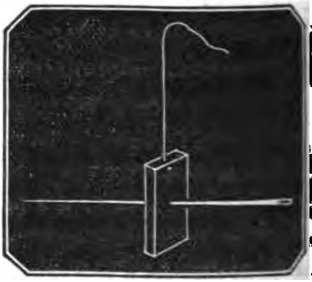


Fig. 1.

from the elastic band a piece about half or three-quarters of an inch long, and then through one end of it run a length of the thread, finishing off with a knot, so that the thread shall sustain the elastic, while the latter shall be a suspending frame for a needle or nail passed horizontally through it.* A small mariner's compass would also be useful.

You are now equipped for a few simple experiments in magnetism, and I beg of you not to take as granted, not to merely acquiesce in, what I write, but, as you read, to go through each experiment indicated; in fact, verify it by manipulation and observation: these give you a practical and more perfect knowledge than any reading can do.

1. Take the bar-magnet in your hand and present one end of it, gradually, towards the iron tacks; on a close approach to them you will see some of the tacks rise towards the magnet, and then, as soon as the end is in their midst, a cluster of them will become adherent to it; now raise the magnet, and you will not only find the cluster of tacks still attached to its end, but tack clinging to tack so as to form a string of them. Some can be shaken off, but not all, and you must brush away the rest with your finger. Try the other end of the magnet among the tacks, and you will get a result similar to that just described. The tacks cluster around, or are attracted towards both ends of the magnet. The same thing will occur if you use the smaller magnet; both have the same properties but not the same power. Now suspend one of the darning needles, as in Fig. 1, p. 640, and bring the two ends of the small magnet successively to the eye and to the point of this needle. Both ends of the magnet attract both ends of the needle. In the place of the needle, suspend a short length of iron wire, or a long nail, and the effect of the ends of the magnet

* Fibres of unspun silk are generally used in experiments of this kind because they are void of torsion, but they are not always to be procured. Did you use these you would also require a loop of paper or card, on which to rest a needle horizontally; I therefore think you will find, as I have done, a waxed thread and piece of elastic the preferable materials. A needle passed through the elastic at right angles to its length may be readily poised so as to rest horizontally when held up by the thread.

on these will be the same as in the case of the needle,—*attraction*. If you try the ends of the larger magnet successively on the poker or the tongs, or on any iron substance in the room, you will find a *pull* between them, indicating attraction. Finally, you had better make the experiment of determining whether there is any similar attraction between the magnet and wood, paper, cloth, glass, earthenware, bronze, silver, gold, brass, in fact, any substance near at hand, which you can suspend by a piece of thread or string. You will find there is no such attraction, and you naturally infer that there must be some special affinity between the magnet and steel and iron.

2. Take one of the darning needles and draw it from end to end along one of the ends of the large magnet; repeat the operation several times, taking care in doing so not to reverse the ends of the needle. Now you can suspend the needle; and on presenting in succession each end of the magnet towards either end of the needle, you will find the result different from what it was in the earlier experiment; there will be repulsion as well as attraction, according to the end of the magnet presented. Operate on the other end of the needle; again there will be repulsion as well as attraction. As a matter of fact you have magnetised the darning needle by drawing it across the magnet, and whereas, in the first experiment (p. 641), the magnetised needle was simply attracted by the magnet, this attraction has now been replaced by a *dual* (or twofold) force, and the later experiment has demonstrated the first important law of magnetism, the *duality of power*. You can now suspend the smaller magnet and operate on its ends with the larger one; you will find the action is the same as in the case of the magnetised darning needle; there is attraction and repulsion according to the ends operated upon, and the ends presented.

3. The opposite ends of a magnet have different properties. Reverting to the suspended magnetised needle, you will probably, by this time, have perceived that it comes to rest in a definite direction,—not indifferently, now in one and now in another direction; that is, if you have taken care to place it away from the immediate vicinity of any iron, or of the large bar-magnet. It

sets its length *nearly* north and south. Discard this needle. Take another, and magnetise it as follows: place the magnet before you, rest the point of the needle on the magnet, and then draw it off diagonally so that the eye end is the last to quit the marked end of the magnet (see Fig. 2); do this several times and then suspend the needle; you will find, as before, that it sets its length nearly north

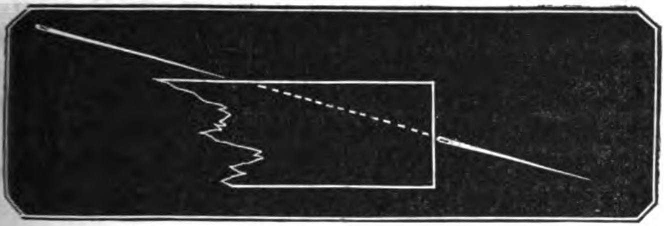


FIG. 2.

and south, and from the method adopted in the magnetisation, the point will settle towards the north and the eye end towards the south. On gently drawing it aside from this position, and then leaving it free to move, you will find that, after several oscillations, it will again return to its original direction. Magnetise a second darning needle in the manner already described, the eye end being the last to quit the magnet; now suspend it, and you will find it to act as did the other needle: point turning towards the north, and eye towards the south; oscillate it, and it reverts to its north and south direction. This tendency of the disturbed magnetised needle to resume its original position, is evidence that the opposite ends of the magnet have different properties.

Note.—When magnetising a short length of steel, or a needle, in the manner indicated above, the end which last leaves the magnet is always opposed in polarity to that end of the magnet with which it has been in contact.

4. You must now, by means of the last two magnetised darning needles, test the action of one magnet upon another. Take one needle in your hand and leave the other suspended: bring the eye end of the former near the eye end of the latter; the suspended needle retreats; it is repelled. Make the same experiment with the two points, you obtain the same results, the suspended needle is repelled. Now cause the dissimilar ends to act on each

other—you have attraction—point attracts eye, and eye attracts point. Prove the reciprocity of this action by removing the suspended needle, and putting the other in its place. You obtain the same result. The attraction then is mutual, and the repulsion is mutual. Similarly, the marked end of one magnet repels the marked end of another; also, the unmarked end of one magnet repels the unmarked end of another; but the marked end of one attracts the unmarked end of another, and *vice versâ*. The ends in which these attractive and repulsive powers appear to be concentrated are called the *poles;* and the experiment illustrates, in the clearest manner possible, the second important law in magnetism, that *like poles repel*, and *unlike poles attract* each other.

5. I dare say you have often heard of propositions to "cut off the magnetism of a ship from the compass." Let us see if this be possible. Your large bar magnet will be sufficiently powerful when placed about two feet from the magnetised needle to cause it to deviate considerably from the north and south direction; try the effect of various substances placed in the intervening space between the needle and the magnet, say tumblers, bricks, a block of coal or wood, a heap of books, a slate, a box of earth or ashes—anything at hand. You will find that one pole acts on another equally as sensibly as if the things were not present, and you will come to the conclusion that it must be lack of knowledge that tempts people to propound the "cutting off" absurdity. It is an indisputable fact that magnetism permeates and interpenetrates every part of the terrestrial sphere—earth, ocean, and atmosphere alike, and it is impossible to intercept the action of magnetic disturbing forces upon a magnet or compass by surrounding either with any substance whatever; if, indeed, any such substance were ever found it would also interrupt terrestrial magnetic action, and the compass would be useless. The only way of destroying the effect of one magnetic disturbing force is to introduce another magnetic disturbing agent, whose force follows the same laws and has the same magnitude, but acts in the opposite direction.

6. A magnet with only one pole is a physical impossibility. If a magnet be broken into several pieces, each piece becomes a magnet

with two poles, having all the properties appertaining to the magnet of which it originally formed a part. Your magnetised darning needle is long enough to be easily broken in two or three pieces; break it and try the effect upon one of the suspended magnetised needles.

7. Mark the *action of a large bar-magnet on a freely suspended needle; the action of the earth is similar to that of the bar-magnet.* The point of the magnetised darning needle is, as before, the north-seeking end, and the eye the south-seeking end; you also know that when an accurately poised, freely suspended magnetic needle comes to rest, it settles in a position nearly north and south. Bring the needle over the centre (c) and within the

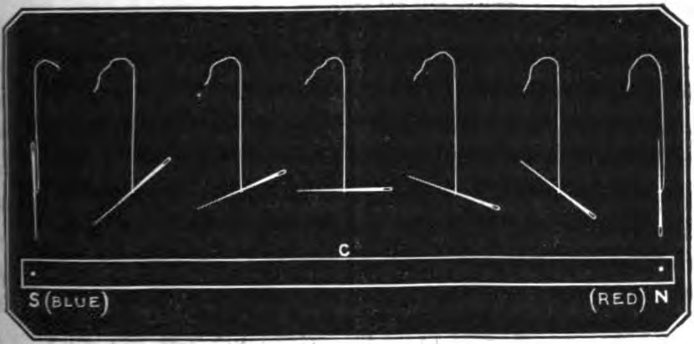


FIG. 3.

influence of the bar-magnet (S N), of which S and N represent respectively the south and north-seeking ends. The needle will retain, at that part of the bar-magnet, its horizontal position, its axis being parallel with the axis of the magnet beneath it, but its poles will forthwith take up the reverse position of the poles of the bar-magnet; thus, the point which you know as the north-seeking end of the needle will tend in the direction of S, the south-seeking end of the magnet. As the needle is gradually moved in the direction of the pole S, it will assume different degrees of inclination or dip—the point downwards, and tending towards S—until, when immediately over S, the suspended needle will take up a vertical position. Bring the needle back again towards the centre (c) of

the magnet, it will incline less and less, and when over *c* resume the horizontal position. Now move it in the direction of the pole N; the result, as regards inclination or dip, is the same as before; but whereas in the former instance the point tended downwards, now the eye (or south-seeking) end will dip towards the pole N, and the needle will again assume a vertical position immediately above N. We may here conceive the bar-magnet to represent a portion of the earth's surface extending along a given magnetic meridian between the magnetic pole of the northern hemisphere and that of the southern hemisphere.

The earth's action, on a freely suspended needle, is this: at the magnetic pole of the northern hemisphere, the needle stands (or dips) vertically, the north-seeking end downwards; when carried thence in the direction of the magnetic equator, the dip becomes less and less, until, when on that equator, it rests horizontally; proceeding into the other hemisphere, dip commences again, but it is now the south-seeking end that dips, and the inclination continues to increase until, at the magnetic pole of the southern hemisphere, the needle again stands vertically, but with the south-seeking end downwards.

The experiment also illustrates—on the principle that like poles repel, and unlike poles attract, each other—that the part of the earth which resembles in its magnetism the north indicating pole of the compass needle is the southern hemisphere.

But to avoid confusion and to dissipate difficulties in connection with the application of the terms "north" and "south," in so far as they relate to geographical direction and position, and to magnetic poles, the Astronomer Royal judiciously proposed that the magnetism of the end of the magnet which pointed nearly to the geographical north should be called *red* magnetism, and that of the opposite end should be called *blue* magnetism, but that these words "red" and "blue" were to convey no meaning except as distinguishing the two ends. On this principle it follows that the magnetism of the *northern hemisphere* is *blue*, and that of the *southern hemisphere* is *red;* and as blue must repel blue, and red repel red, while blue must attract red and *vice versâ*, the red end of the compass needle, which seeks the blue pole of the northern

magnetic hemisphere, is properly indicated north, since it is chiefly, if not wholly, used for geographical purposes.

As regards the force that directs a magnet to the north or south horizon, it is not simply attraction of one end or the other, nor simply repulsion, but the forces are equal, as much attraction as repulsion.

These experiments relate to the magnetism of permanent magnets and to terrestrial magnetism. There is yet another kind.

8. If a length of soft iron having no magnetism be brought very near to one pole of a magnet, a *temporary* state of magnetism, of a quality opposite to that of the pole, is *induced* in it. Thus if A be the bar-magnet, and the soft iron be placed as at B, in the upper part of Fig. 4, then the unmarked end S, that is, the *blue* pole of the magnet will induce in the soft iron a *red* pole at *n*,

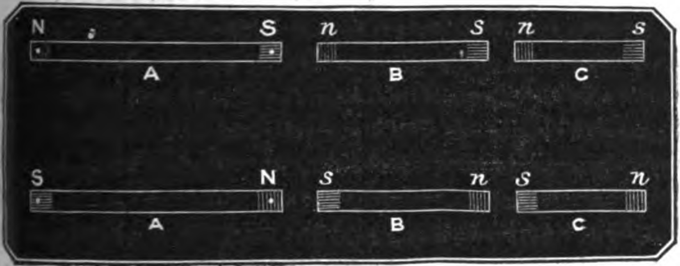


FIG. 4.

and as a consequence a blue pole will be produced at *s*: a second piece of soft iron, as C, will also receive magnetism by induction on being placed contiguous to the piece at B; and so on, through several lengths. When the magnet A is removed all semblance of magnetic property will disappear from the soft iron. But if, as in the lower part of the fig., the magnet A be turned, end for end, and the position of its poles changed, then the marked end N, that is, the *red* pole of the magnet, will instantly induce, in the ends of the soft iron, poles of a character opposite to those they previously had. You can test this by holding the suspended magnetic needle successively to the outermost ends of the soft iron; and the experiment is an illustration of the effect of

transient induced magnetism; it also explains the previous experiments (p. 641), for the pole of a magnet, *by induction*, produces a pole of the opposite quality in the nearest part of the iron, and between unlike poles there is attraction.

You can try the effect, on the suspended needle, of a single long bar of soft iron, or of the poker, when each end of the iron is successively brought close to a pole of the bar-magnet; you will find the magnetic action greater than before, because the same mass of iron divided into several parts generally produces a smaller effect than an undivided mass.

You remember the experiment of the tacks and the two poles of the magnet (p. 641); try it again; this is the result of induction; every tack while so situated has two poles; similarly, by dipping a pole of the magnet among the iron filings, a brush of them is formed at the pole, each particular grain of iron being a temporary magnet, inducing magnetism, and attracting other particles.

9. You can now conceive that on placing two magnets in the same line, but a short distance apart, with unlike poles turned towards each other, if a soft iron rod be laid in the intervening space and in the line of the magnets, then, the rod will be magnetised by *induction:* the red pole of one magnet will produce a blue pole in the contiguous end of the soft iron, and, similarly, the blue pole of the other magnet will produce in the rod a red pole. On turning the rod about its centre, its magnetism will gradually become less and less, until, when at right angles to the line of magnetisation, it will be neutral: if the rod be further turned until the position of the ends has been changed with respect to the magnet, the magnetism of the ends will be the opposite of that they had before. By proper manipulation the earth will do this for us, and show the result on a suspended needle. Thus—

If a soft iron rod be presented end ways to the centre of a freely suspended magnetic needle, the direction of the rod being east and west, *i.e.*, at right angles to the needle, and also exactly horizontal, there will be neither attraction nor repulsion. If it be presented endways to either pole of the magnet it will slightly attract that pole, by *induction*, as just explained. It is indifferent which end of the rod is presented to the magnet. But if the rod be held in a

vertical position, then, on successively raising and depressing it, the end which is downwards will repel the red or N-seeking pole of the magnet and attract the blue pole; but the upper end of the rod will attract the red and repel the blue pole. The soft iron rod has become, in its vertical position, a true magnet, but the magnetism is only transient, for upon inverting the rod the properties of its ends are also inverted, and all magnetism will vanish when it is placed horizontally in an east and west direction, though it will retain a small amount if placed horizontally in a north and south position.

The earth, which is a powerful magnet, has induced this magnetism into the vertical rod. The direction of the magnetic force in London, this year, is the same as if there were a *blue* pole 18½° west of true north, and 67½° below the horizon; and also a *red* pole 18½° east of true south and 67½° above the horizon: this is the direction of the line of force, or the line of *dip*, and the more nearly a soft iron rod is held or supported in this direction, the more powerful is its effect on the poles of a magnetic needle.

You can readily try this experiment, and others of a similar character; take the poker, and present it *vertically* before the ends of the suspended magnetic needle; first the knob, and then the lower point: if, in any of the positions, either end acts sluggishly on the needle, this shows that the iron has not quite lost the magnetism it had acquired in a previous direction; but you can greatly increase and accelerate the magnetic action by sharply striking with a hammer the end of the poker. Thus, with knob uppermost and presented to the N.-seeking (red) end of the needle, strike the knob, and the red pole will be briskly drawn towards it; similarly, strike the lower end of the poker and present it (downwards) to the same pole, and it will now turn away with accelerated speed. Reverse the ends of the poker; owing to the hammering the poles of the needle will not be so speedily acted on as before; but again apply the hammer, and there will be quick repulsion and attraction of the proper poles.

10. Terrestrial magnetic force will temporarily magnetise a sphere of soft iron in the same way as it does a rod or bar. The diameter in the line of *dip* will be the magnetic axis; the lower and

northern half of the surface will have the same magnetic quality as the N.-seeking end of the needle, *red*; the upper and southern half will be *blue*.

It is hoped that you will try these experiments, and vary them in many different ways; you will then be prepared to understand the action of an iron ship on the compass.

W. H. R.

(To be continued).

THE TAY BRIDGE.

THE straightforward and exhaustive report of the Wreck Commissioner on the Tay Bridge disaster, will be accepted by the public generally as correct, although professional men will probably dispute some of the premises. However this may be, the astounding fact remains that English engineers have, as a body, disregarded wind pressure as a factor in construction, or attached so small a value to it as to render the results worthless. In some measure this has arisen from the erroneous impression that even in large estuaries the heavy squalls only impinged on a small portion of the structure exposed. There cannot be a greater mistake, as anyone may convince himself of if he will take his stand on the shores of the Firths of Tay or Forth during a very heavy gale. At such times the *whole surface* of the water is covered with spoondrift, demonstrating that throughout the pressure cannot be under 40 lbs. to the square foot, often more. In very narrow gorges the force far exceeds the above figure, but in the Tay the configuration of the land prevents any unusual accumulation over a small space. If the law which the designer of this bridge acted on held good, it would be quite possible for particular ships, when sailing in line of battle, to escape being struck by unusually fierce squalls, although their neighbours might be dismasted. We know that such is not the case, and that the whole are alike exposed to their influence. 'though this is well known to every seaman, engineers appear to

have assumed that it was not possible for more than a single span of the Tay bridge to be acted on at the same time, to meet which the maximum mean pressure of the wind was assumed not to exceed 10 lbs. per square foot. Were the subject not so painful, it would be amusing to note the pretended accuracy with which it is essayed to calculate the force exerted on a passing train on the lee side of the girder by the wind, after it had passed through the interstices to windward. Theoretically there should only be one law for such a calculation; multiply the area of the weather side by two and add the area of the exposed carriage surface to it. Where life is at stake, it is inexcusable not to allow a wide margin of safety, especially when the material depended on is subject to deterioration. When it is known that during a long series of years the pressure and velocity of the wind have been measured and recorded at many stations, the vague statements made by experts to the Commissioners appear surprising. In December, 1863, England was swept by a gale whose pressure up to 47 lbs. on the square foot has been carefully recorded. At that point the magnificent self-registering apparatus of the Liverpool Observatory unfortunately broke, consequently any increase is a matter of conjecture. The sands of New Brighton were driving along like mist, and far inland, it was difficult, except by the sense of taste, to distinguish the salt spray from rain. In many parts of the country telegraph posts were uprooted and wires broken to such an extent that messages were delayed in transmission for unusual periods. The tabulated results of this storm were not hidden under a bushel, on the contrary, the astronomer who recorded them took a pleasure in explaining to all who were interested the various curves traced by the instrument. The sudden advent of this gale was its most remarkable feature, for although the barometer was low, and indeed had been so for many days, the season of the year rendered such an occurrence less noteworthy, owing to its being attended with a succession of southerly winds and frequent showers of rain. From a comparative moderate breeze, not of sufficient force to prevent the Mersey boatmen from pursuing their calling on the river, the wind suddenly increased to a hurricane, veering rapidly from south-west to north-north-west and occasionally to

north. The estuary assumed the appearance of the open sea, heavy sand-laden waves rolling over the long line of sea wall, sending their spray over the roofs of the warehouses to the ships beyond and the lower streets of the town. From Seacombe to the Sloyne vessels were driving or parting. A huge American liner came yard arm with our ship placing both in a situation of considerable danger; the seas, wedged in between the sides of both, rose in pyramidal heaps, twisting and eddying into fantastic shapes before their force was spent. It was a relief to both when the American again shouldered her anchor and drove slowly by, finally bringing up in a position of safety higher up the river. This is only one gale of many, from which records valuable and interesting information might be gathered, useful alike to the engineer, the seaman, and the meteorologist. For reasons which cannot even be guessed at, it is evident that up to the present time the first named has not allowed the full force of the wind to become a factor in his calculations. The lesson which has been thus dearly bought must not be lost sight of, for possibly other dangers or unthought of elements of decay exist elsewhere.

The report states that the bridge was badly designed, but full particulars are not entered into, presumably by reason of the necessity which such a course would entail of entering fully into technical details. The mechanical journals have gone into the necessary calculations, which need not be repeated here, and it would seem from the results, that to run a train at a high rate of speed at such an elevation, requires an amount of stability which the bridge certainly did not possess.

Report states that the central girders are to be lowered twenty feet in order to reduce the leverage in high gales. It is, however, doubtful if this comparatively slight reduction will be sufficient to ensure safety in such an exposed position as the Firth of Tay. We are of opinion that double the amount will not suffice, for neither bracing nor moderate lowering can remedy the very grave defect of a narrow base. From the position taken up by the Town Council of Perth the railway company are hedged between very narrow limits, and their attention must be drawn to the only practical course open if the work is to be reconstructed on the

original design. An additional row of masonry piers on either side for struts to rest on would, with stronger central girders, fulfil all that is required. Still the Directors are landed in a grave difficulty with the public whatever course they may adopt. The burnt child justly dreads the fire, and a long series of years will elapse before the feeling of nervousness now extant passes away. Structures like the Tay Bridge are subjected to a danger which appears alike to have escaped the observation of the designer, and that of the celebrated savans who gave evidence before the Committee, notwithstanding that it probably contributed in a marked degree to the disaster. Bodies liable to isochronous effects of wind or waves acquire a momentum, under favourable conditions, the force of which can scarcely be estimated. Doubtless the periods of the bridge's movement thus acquired often corresponded with the maximum force of the squalls as they swept down the river, setting up a rupturing force which silently and unnoticed carried on its work of destruction. Anyone may satisfy himself of the peculiar action of these squalls by watching the surface of the water abreast of a gorge. The crests of the wind waves are as clearly defined as those of the ocean, and their periods equally well marked. The lugs and holes for the stay pins appear to have been defective in form and surface. The conical shape of the latter at once introduced a weakness which could not be compensated, and which probably accelerated the disaster. It is almost superfluous to add that the proportions for eyes and stay pins were ascertained by an elaborate set of experiments in building a bridge over the River Neva.

Some of the witnesses stated that rimering the holes true would have weakened the iron by breaking the outer surface. Although such a result follows, still, as there is no reason, practical or theoretical, for limiting the thickness of metal, the required strength might easily have been attained by increasing the size of the lugs in moulding. Not only do these appear to have been weak, but the pins of many were small for the holes, a fatal defect where rigidity was an absolute condition of safety. In future, engineers will, it is believed, depend more on original design than bracing, for it is evident that where there is vibration the best

constructed joints will ultimately work, and when once the parts commence to chatter and slide on each other, friction and corrosion do the remainder. The slight difference between the spread of the feet of the columns and the roadway is painfully obvious, so much so that the tendency to tear the weather fastenings from the masonry was practically unresisted by the struts to leeward. For such a height the base should have been at least twice its present width, with the feet of the columns connected as sheer legs sometimes are, if they show any signs of opening out. If the tyes or braces are not close down, the holding down bolts come in for more than their fair share of work when under the influence of lateral pressure. These bolts ought not to be subjected to excessive strains in any direction, their mission should be simply to steady the structure in position, not to act as an integral part of it. The strain which was put on these bolts is vouched for by the fact that the masonry was pulled up in several places. This fact shows another defect, it being evident that the masonry should be formed of materials of sufficient strength to fracture the holding down bolts, if from any cause such a test was required.

In such a variable climate the judiciousness of filling in the columns with mortar or cement is very questionable, owing to the constant pulsations of contraction and expansion in the material. So far from being a source of stability, it must, by increasing the force of the momentum when motion had once set in, have added another element of danger to those which already existed. It is scarcely too much to say that among all the powers of nature which the engineer is called on to grapple with, contraction and expansion are the most difficult to guard against, if the particles are not homogeneous. As increase of weight seems to be the only purpose served by this system of filling in the columns, is there any known reason why kiln dried quartz sand should not have been used in lieu of a material that must from its constituents be affected beyond all others by changes of temperature. The thermometer on the east coast of Scotland may be roughly estimated to range between an extreme summer heat of 80° Fahrenheit and 15° below freezing, but this does not represent

the total of the change to which the ironwork of the bridge would be subjected. Iron, especially when painted dark red, absorbs heat to such an extent on a hot summer day that it is impossible to keep the hand on it for more than a few seconds without pain; thus the extreme difference between summer and winter cannot be under 120°. Primitive races are alleged to have separated huge blocks of stone from the quarry by a knowledge of the effects of a change of temperature. A gutterway was cut at the place required, in which a fire was kept up for some time; afterwards cold water freely applied caused the whole to rend asunder. In what manner heat and cold have silently worked on the Tay Bridge must be a matter of surmise only, we can but think that they have contributed their share to this unparalleled disaster, this painful wreck of the genius, experience, and happiness of a man of whom the engineering profession were justly proud.

The Wreck Commissioner stated correctly that American engineers were accustomed to estimate the pressure of the wind at 50 lbs. on the square foot. Careful study and experience have led them to the conclusion, that any structure which might be called on to withstand the fury of the hurricanes that occasionally sweep the Florida stream, or the spasmodic tornadoes of the central States, would not be safe if that constant were disregarded. The Florida reefs are fringed with lighthouses erected on iron screw piles, but in no instance does one approach the height of the central girders of the Tay Bridge; it was left to English engineers to essay the impossible. A careful examination of the designs of the pile lighthouses will show that in every instance great breadth of base has been insisted on. To have exposed them to the full force of the hurricane on any other principle would have been simply to court disaster. As it is, these frail-looking structures stand year after year the full force of storms which occasionally blow sugar boilers from their seatings, uproot the gigantic trees of the primeval forest, or fell a lane through their midst as deftly as the sturdy woodsman might do. During the erection of the Tay Bridge an unmistakeable warning was given by the destruction or bodily lifting of some of the girders during a heavy gale. Certainly such a warning should have suggested that when in place, with a long train rolling

over them at a high rate of speed, the lateral pressure would exceed 10 lb. per square foot. If not, it is pretty evident that chance had a greater share than observation and science in laying down the plans. There ought not to be any difficulty in deciding on the normal wind pressure which exposed works may be called on to resist, since a series of observations extending over a long series of years are at the command of engineers. What allowance in excess of the recorded quantity will be necessary for a particular locality will depend on the nature of the undertaking, and to attempt to lay down an universal law can only act injuriously on the profession. By refusing to join his colleagues in requesting the Board of Trade to fix the wind pressure, it appears to us that the Wreck Commissioner acted judiciously, and that the engineering world will hail his decision with satisfaction.

A Committee of the House of Commons are about to consider the advisability of re-erecting the work on its original design. They have a grave responsibility, one from which many would individually shrink, but doubtless those who are entrusted with the onerous task will duly appreciate the gravity of the situation, and, aided by the engineering talent of the country, bring unerring judgment and science to bear on such an important question.

W.

GRAPHIC NAVIGATION.

To the Editor of the "Nautical Magazine."

SIR,—Anyone who has had the opportunity of looking over old works on Navigation—say more than a century old—must have been struck with the prominence given to the solution of problems by scale and compasses. We have still, in our epitomes, directions for solving plane trigonometry questions "by construction," but there is no doubt the practice has for a century past been falling into disuse. I cannot help thinking this is a matter of regret, for, in navigation, as in every other case where graphic methods are applicable, direct construction is vastly more intelligible and

interesting than wrestling with figures. I think the time has come when we should revert to what was evidently the practice of our sea-going forefathers, if for no other reason, because the "Sumner method" and the new, or "Intersectional" navigation, which you have been recently so lucidly explaining to your readers, absolutely demands "construction" in its final stage. The time is not far distant when the Board of Trade may require a knowledge of these problems. Young navigators, therefore, will do well to make themselves acquainted with, and at least as expert in the graphic solution of problems, as in the manipulation of logarithms and the Traverse Table. This being so, no apology is needed for a few suggestions for facilitating the solution of traverses, and all questions in the "sailings," especially windward sailing and current problems. The ordinary mode of construction is to draw a circle with the chord of 60°, then set off the courses from the scale of degrees or rhumbs, on Gunter's scale. It may be done also by laying off the angles by different kinds of protractors, and I wish to point out that the very best kind of protractor for nautical purposes, is a compass card 6 to 8in. in diameter. With that, a sailor deals with a familiar object, and such a thing as making a mistake is pretty nearly out of the question. He does on paper precisely what his ship has done, or is going to do before his eyes. Let anyone take a compass card of the size specified, divided into degrees, as well as into points, halves, and quarters; a parallel rule from 6 in. to 12 in. in length, with edges nicely bevelled, and divided into inches, tenths, and twentieths, or into centimetres and millimetres; and a pricker made by pushing a pin or needle through the india-rubber tip of a modern pencil, which should be as hard as it can be bought, and cut to a fine point; and, with moderate care, he will find he can solve by construction any traverse or other plane problem more rapidly and quite as correctly as by the Traverse Table or by logarithms. Place the card on a piece of paper large enough for the purpose required, put on it a weight to prevent shifting, then, holding the pricker vertically, prick first through the centre and then through every degree or point included in the problem. As each puncture is made, write close against it the order of the course, if it is a traverse, and the

number of miles made on that course in the form of a fraction—thus, $\frac{1}{25}$, $\frac{2}{15}$, $\frac{3}{40}$, and so on, till all are set off. If a windward problem, write "port," "wind," "pt.," and "st." for the courses the ship will lay on the two tacks; and so on for other problems. Then remove the card, surround the central point with a small circle thus $\odot$; and with the parallel rules lay off each course in succession, connecting them in the ordinary way. With parallels divided as I suggest, distances can be pricked off at the same time as the courses are protracted. I only use the pencil to indicate the termination of each course by surrounding the puncture with a small circle. It will be seen that by this method, compasses and a separate scale are not needed. If the operator however possesses a pair, he can utilize them; let him open them to the radius of his compass card; then put one leg in the centre hole of the paper, and the other in the hole in the circumference, and then, by placing his ruler against both legs, he will secure parallelism with the least trouble and loss of time. Scratching lines on the paper with the pricker make marks which are perfectly visible in a good light and which are conducive to accuracy in results. I have been experimenting with a circle of 7 inches diameter very roughly drawn on tracing paper, and with points, half, and quarter points only laid down (not I fear very accurately) and yet I find I can work a traverse within a low decimal of what is given as the correct answer by figures, more rapidly than I can by the Traverse Table, and with obviously less liability to error. With a good compass card of the same diameter you could work to quarter degrees, and quite equal the closest calculation. This I have tested by means of a 7 inch semi-circular horn protractor divided into degrees, with which I have adopted the plan of piercing minute pin holes in the centre and at the circumference. Drawing a meridian line on the paper, I put two fine drawing pins through these holes, and placing the protractor over the line, press in the centre pin. The protractor now works round this as a centre, and reading off to a quarter degree the required angle by means of the meridian line, a gentle pressure on the other pin lays it off. Instead of the second drawing pin at the circumference the pricker may be used, and then the operator

has in hand the pencil for numbering the course and putting down the number of miles to be laid down. It is obvious that if the circumference of a compass card (degrees and rhumbs) were printed on a paper, all that would be needed to protract any problem would be parallel rule and pencil pricker. I would therefore suggest to nautical publishers that they might, at no great expense, increase the utility of log books by printing such a circle, say, of 7 inches diameter, on each of the blank leaves. A sailor would then have always before him a means of protracting a problem with the minimum of trouble. Printed on a stout piece of tracing paper, say, 12 × 8 in., with all the blank part covered with lines truly parallel to the N. and S. and the E. and W. lines of the compass, such a "paper protractor" would be very useful for chart work. When the ship's position is pricked on the chart, the centre of the compass might be placed over it and one of the lines on the tracing paper made to coincide with a meridian or parallel on the chart. The N. and S. line of the protractor would be then true N. and S. on the chart, and a weight superimposed would keep it so. A piece of fine black cotton stretched from the ship's place to her destination would give her course directly, and her distance pretty nearly by halving the cotton and applying it to the scale of latitude in the margin above and below the parallel of the ship's place.

It may be urged against these paper contrivances that they are too fragile and easily damaged to be brought into practical use. Though, with reasonable care, I think one might be used every day for a year, yet I admit there is some ground for this objection, and therefore I suggest a form of protractor not open to this objection, which might be made of sheet brass, or wood and brass, or, better still, of steel employed by Messrs. Chesterman, of Sheffield, who make scales in which 100 perfect divisions are put into an inch. I have had one made, as an experiment, out of boxwood. It is a semicircular protractor, 7 inches in diameter, marked with degrees and half degrees, numbered from 0 at the N. and S. line, right and left, to 90° at the E. and W. diameter. On an inner circle it is divided into rhumbs, numbered in like manner from 0 to 8, right and left. I have two fine holes drilled, to use it like the horn

protractor, and to the diameter I have had a second piece attached, so that the same instrument acts as a parallel ruler, which is divided into inches, tenths, and twentieths. I have had a brass vernier piece made, by which degrees can be divided into tenths, or into 6 minutes of arc. This swivels round a drawing-pin, and if the vernier is used the protractor remains a fixture. If such minute accuracy is not needed the whole concern can be swivelled round the drawing-pin, like the horn protractor, and then you can work very well to quarter degrees.

It has struck me that with very little trouble and expense every octant and sextant might be made to protract angles, and if this were done it would be quite possible to revert to the stereographic projection, which our forefathers also utilised, and solve with sufficient accuracy for practical purposes many spherical problems. I have suggested this to one or two makers of these beautiful instruments, and though it has not found much favour in their sight, I have little doubt that some enterprising French or American maker will utilize the idea.

Yours, &c.

F. R. M.

MADAGASCAR.

An extremely interesting paper on the arts and commerce of Madagascar was recently read at a meeting of the Society of Arts by the Rev. J. Sibree, a well-known and much-respected missionary, who has been resident in the island for many years. Our space precludes the publication of the paper *in extenso*, but the following extracts form the chief points of interest for the nautical community:—

"Physical Features.—Madagascar is a well-watered country, especially on the eastern side, where the forest-clad hills catch the vapour-laden trade winds from the south-east. The rainy season lasts from November to April. The only arid portion is on the south-west, where the rainfall is scanty. But although the rivers

are numerous, there are not many streams of great size, or uninterrupted depth of water; for, owing to the physical features of the interior, their courses are almost all broken up by rocky bars and sandbanks, by which navigation is interrupted. By some of them, however, access could be gained for a hundred miles, or more, into the interior, by steamers of light draught. Along the eastern coast, within a short distance from the sea, is a chain of lagoons, extending for nearly 300 miles. By a comparatively small expenditure, these could be all connected together, so as to form a continuous water-way. This work was actually commenced in the reign of Radàma I. (about 55 years ago), and it will, no doubt, at some time be carried through, and thus form a valuable means of communication and traffic between the eastern provinces."

"DISCOVERY AND ACCOUNTS OF EARLY VOYAGERS.—Madagascar was known by report to the early geographers, both European and Arabian, under a variety of names; but the Venetian traveller, Marco Polo, was the first to give any information as to the country and its people. But his accounts are full of inaccuracies, as he never saw the island; and it was not until the year 1506 that Europeans set foot upon its shores. On the 1st of February of that year it was discovered by Fernando Soares, a captain in the fleet of Lourenco de Almeida, the Portugese Viceroy of the Indies; and within a few months afterwards it was circumnavigated by some of the most famous naval commanders of that nation. The Portuguese accordingly gave names to many of the chief capes and bays, and were the first to plant colonies on portions of the eastern coast. But their more important possessions at that period in the further east soon led them to abandon their Madagascar settlements; and, subsequently, the French founded several military posts on the east side of the island, especially that of Fort Dauphin at its south-east point. These, however, were not in any true sense colonies, but merely armed occupations of small portions of the coast, positions which were all eventually destroyed through the well-merited hatred of the native population, or abandoned on account of their unhealthiness. The small islands of St. Marie, off the east coast, and Nossi-be, off the north-west coast, are now the only remnants of French occupation of Madagascar."

"Inland Communication.—*Canoes and Boats.*—Water-carriage is largely made use of on the rivers and coast lagoons. The native canoe is made of the hollowed-out trunk of a tree, chiefly the *varòngy* (*Calophyllum inophyllum*), and some of the canoes are forty feet long, with about three feet beam. On the south-east coast, a native boat, called *sàry*, is used. This is a boat built of planks, but no iron is used in its construction, everything being tied together by the wire-like fibre of the *anìvona* palm, while the holes are plugged by tree-nails of hard wood. The seams are caulked with strips of bamboo, and loops of the same material form rowlocks for the larger oars. The seats pass right through the sides, and thus stiffen the whole, and bind it together, for there are no ribs or framework. These boats rise up at the stem and stern, and will carry 50 people, or a large quantity of goods. They are used for going out to the shipping through the heavy surf, where no canoe could possibly venture. These ingeniously-made boats have evidently been in use for a considerable period, as they are referred to by some of the earliest French books on Madagascar, written from 150 to 200 years ago. On the west coast outriggers are adopted, and canoes fitted with these and with sails venture out to sea in a very fearless way. The natives along that portion of the island are bold navigators, and until the early portion of this century, they were accustomed to make an annual piratical expedition to the Còmoro Islands, in which hundreds of canoes, carrying thousands of men, were employed. Most of these must, therefore, have been boats of considerable size and seaworthy properties."

"Madagascar as a Produce-supplying Country.—In reply to the first of these questions, it wlll have been already inferred from the facts given above, that the country is capable of supplying many of the most valuable products of the tropical zone. Rice, sugar, coffee and spices, silk, cotton and hemp, indigo, and tobacco, might all be produced in practically unlimited quantities. At present, however, rice, sugar, and coffee, are the only articles out of this list which are grown for exportation. The cultivation of coffee is yearly increasing, and numerous small plantations have been formed along the shores of the east coast rivers by Creole traders. For several years past large quantities of gum-

copal and india-rubber have also been exported, but owing to the reckless manner in which the trees supplying the latter have been cut down, it is feared that the whole trade will come to an end before long, unless some steps are taken to remedy the evil. In the southern part of the island, a lichen, called *orseille*, which is valuable for dyeing, is collected in considerable quantities."

"CHIEF EXPORTS.—The most important item of export at present is cattle. The colonies of Mauritius and Bourbon derive their entire supply of beef from the fine humped oxen which are shipped by thousands from the eastern ports. Very lately, however, the trade is said to be leaving the eastern side of the island, the ships fetching the cattle from the north-west coast, owing to their greater cheapness in the Sàkalàva country. A considerable trade has also sprung up between the south-west ports and Natal. Hides are sent down in large quantities, from the interior, being dried and salted for exportation. The valuable woods found in the forests would also form an important article of trade were they allowed to be exported, but at present it is forbidden by the native laws to export timber. Ebony and numerous hard and beautiful woods resembling teak, rosewood, and mahogany, are found in the forests, and are used for cabinet work, and in building, and also in making the parquetry flooring in the best class of houses. The exports and imports of Madagascar, and their annual value, will be seen by the following extracts from the English consular reports; these, however, only refer to the goods in British ships, and from the eastern side of the island; and I regret that I have been unable to procure any information later than the dates here given:—

Year.	Imports.			Exports.		
	£	s.	d.	£	s.	d.
1870	57,922	13	10	63,047	3	5
1871	105,595	12	4	88,230	8	2
1872	154,659	11	9	145,258	8	8

"Of the imports in 1872, the chief items were—Cotton goods (£47,899); specie (£56,678); rum (£20,262); haberdashery (£8,103); and hardware (£4,701). Of the exports for the same year—India-rubber (£65,152); oxen (10,971, worth £46,059.)"

In the discussion following the reading of the paper, Mr. Richard-

son, who has also resided many years in Madagascar, made some valuable observations, from which we extract the following:—

"It was stated in the paper that the small island of St. Marie's was now the only remnant of the French occupation of Madagascar; but the French also possessed another island on the east coast, and a very important trade was carried on with that island which was known as Nonsobayé. Steamers brought produce every month from Nonsobayé to Zanzibar and Aden, whence it ultimately reached England. Certainly, as remarked in the paper, there was great danger of the French establishing themselves in Madagascar. The priests were very influential, and the French consul, to whom Mr. Sibree referred, had lately done some very questionable things; but the Government of Madagascar had got the better of him of late; and the recent excitement appearing in the newspapers on the subject, might now be dismissed, as he believed any differences between ourselves and the French would be amicably settled. It should not be forgotten, in considering the affairs and the immediate future of Madagascar, that the central Government in Antananarivo was really as far removed from some of the stations, practically speaking, as London was from New York, or even from San Francisco or Shanghai, looking at the difficulty of communication and access, so that progress must naturally be somewhat slow. Above all, the Madagascar Government believed that the French had designs upon their country, and for that reason they considered it was to their interest not to facilitate communication, but to keep the roads bad, and, in fact, everything was done to keep foreigners out of the island. But they manifested a great respect for Englishmen; they knew that we have no designs on Madagascar, and were willing to submit to our influence. Still we must be content to wait for many years before we could see Madagascar develope into a food-producing country, and rise in the scale of nations. We must remember that Christianity had only made itself really felt in the island during the last ten or twelve years. On the other hand, the husband of the present Queen was a most intelligent and high-minded man, and was labouring in the interests of the people. might state, as evidences of advancement, that the Queen had

founded an hospital, and had now two European doctors in her employ, one at £400 and the other at £180 a year, and she had done all she could to encourage her people to enter the churches and to learn to read. She had also amended the law of divorce, and abolished polygamy; and, by a late proclamation, she had further abolished the conscription for military service for life, and made it binding, universally, for the space of five years only. He had every hope in the Queen and Prime Minister of Madagascar, and believed that ultimately the country would become of very great importance in the history of the world. But we must have patience with them, and if we could only get Christian traders and travellers to penetrate through the country, they would have even greater influence than the missionaries. It could not be denied that at present the Government of Madagascar did not hold out many inducements to foreigners to go into the island, but the reason was their fear of the French."

THE "LIVADIA."

THE most recent specimen of a Popoffka has been launched from the shipbuilding yard of Messrs. John Elder and Co., of Glasgow, in the shape of a magnificent steam yacht for the Czar of Russia. The great object which the designers have had in view is to secure steadiness of platform, and it is believed that the arrangements will considerably lessen the discomfort of sea voyaging to those on board. It is also claimed for the new ship that although apparently heavy in the water and of great bulk, she will have a speed quite equal to fourteen knots. Moreover, the internal accommodation is very spacious and luxurious; in fact, the yacht is well described as a water palace.

The designer of this new type of vessel is Admiral Popoff, who is probably known to our readers as the Chief Constructor of the Russian Navy, and as the originator of the Popoffkas of the Russian fleet. Mr. William Pearce, the head of the firm of John

Elder and Co., received his instructions at a conference with the Grand Duke Constantine and Admiral Popoff, and under Mr. Pearce's special directions and the supervision of Captain Goulaeff, of the Russian Imperial Service of Naval Architects, the yacht has been constructed.

The new yacht may be described as a palace raised on an enormous hollow steel turbot. The lines of the turbot-shaped raft on which the palace is built sweep round in front into a pointed bow or beak; at the sides they expand so as to give a wide and spacious area to the back on which the superstructure is raised; at the stern they again come to a point. At the widest part the breadth is 153 ft., more than three-fifths of the length, which is 230 ft. The depth of the fish-like raft in the centre is 18 ft., and the water-line is only 6 ft. above the lowest point. At the stern, however, a small depression, making a draft of 16 ft. in all, is effected to give the screws water to work in. This part of the ship may be lifted to cross shallows, such as those, for instance, at the mouth of the Dnieper, on the way to Nicolaieff, by flooding the fore compartments. There is no freeboard, properly so called. Stability is given by breadth and weight. The bottom has a flat area of 14,500 square feet. At the edges the surface trends out and upwards all round the ship towards the water-line. But as soon as the ordinary water-line is reached, by gradients which equal 6 ft. perpendicular, a change is made in the direction of the curves. The outward slope is succeeded by a slope inwards, which continues till the perpendicular depth of 18 ft. has been given to the whole substructure. It gradually rises to this all round, and in the middle of the back of the fish there is a wide flat space of about 15,000 ft. Such is the floating raft on which the water-palace of the Czar is borne. The air is stored, for the sake of safety, in innumerable close compartments. The object of the upper re-entering slope will be easily understood. The wash of the waves against a straight or overhanging wall encounters a resistance, in overcoming which the waves shake to and fro the vessel which thus opposes them. But they will run up the lower part of the new yacht, and so lose their force before reaching the ᵕer structure.

The lower body or raft of the vessel is built entirely of mild Siemens steel, with a water-tight double bottom, 3 ft. 6 in. deep in the centre, and 2 ft. 6 in. at the extremities. There is a double row of water-tight cells along the sides. The motive power is supplied by three screws. Three keels run in straight lines lengthwise underneath the fish-part of the yacht, one in the centre, the others 18 ft. to the right and left of the central keel. Above the keels there are, in the interior of the vessel, three propeller shafts, terminating in screw-propellers of manganese bronze, combining great strength with lightness. There are three sets of engines to work the three screws. To secure fixity for the engine seat, it is made in one with the frame of the ship, all of malleable iron and steel. The engines are the lightest for their power in the world, the condenser of sheet brass, the piston-rods, and bolts all over the engine, of mild steel. The boilers are made by Messrs. Elder, of steel manufactured by Messrs. Charles Cammel and Co., of Sheffield; the furnaces and other internal parts are of bowling iron, the tubes of brass. The use of manganese bronze, a material of great tensile strength, for the blades of the screw, is expected to save 4 per cent. of friction. It is not known that screws of large size have been made of this material before. The diameter of the propellers is 16 ft.; they have four blades, and 20 ft. pitch. Of the two outside screws, one is right-handed and the other left-handed. The middle screw is about 2 ft. 6 in. further aft than the side screws, the screws being more than one-half of their diameter below the flat bottom of the ship; they will work in undisturbed water, and not, as is usual, at a disadvantage in water broken by the passage of the hull. As at the point where the screws are the draught of the ship will be, in a small projecting portion, 16 ft., and the engines are towards the bow, where the draught is 6 ft., it is necessary to slope the propeller shafts. The middle shaft will be sloped at an angle of 2·7 deg., or will fall about 1 ft. in 20 ft. The total length of the shaft is 150 ft., and the total fall exceeds 7 ft. The other shafts are sloped proportionately. The nine boilers, three to each screw, are capable of holding about 400 tons weight of water, and are therefore placed amidships. Here also are the coal bunkers. The horse-power is 10,500; the speed obtained, 14

knots; but a greater power and greater speed will, it is expected, be developed. The engines are of about equal power the one with the other. There will be but one rudder, and that will be abaft the central screw, the side screws being adapted for the steering of the ship and regulated from the bridge.

The bridge belongs, of course, to the upper portion of the vessel laid upon the steam-propelled, air-inflated, steel fish which has been described. This upper portion more nearly resembles an ordinary ship in shape, a ship which supports a double row of wooden deck-houses. It is of steel and wood, 260 ft. long, and 153 ft. wide at the broadest portion. It will be observed that it is a little longer than the raft below. The ends coincide where the two portions join, but the bow is of clipper form, trending forward and hence slightly extends the length. At bow and stern the superstructure coincides in width with the raft, but speedily retreats from the latter's broad and swelling outline, and at the centre is narrower by 43 ft. than the raft on which it rests. That is to say, the raft at this point bulges out 21½ ft. on the right, and the same distance on the left from the ship, as if the vessel's hold had taken a lateral expansion. Just at the point where the junction between the upper and lower portions of the composite vessel in effected by a bracket-frame connexion in what may be called the lower deck—a mere wooden floor erected above the rounded steel deck, partly open and partly closed, which forms the upper surface of the raft. On the forward part of this wooden deck is the capstan for the anchor and crew space. Forward also will be a large cabin for the lower class of stewards, whose berths will be arranged on each side of it on the sides of the ship. The side cabins, lighted by large rectangular windows (3 ft. 6 in. high and 2 ft. 6 in. wide), provided with flaps to close in rough weather if necessary. A little forward of amidships the deck is broken by the hatchway for the engines. It is no less than 48 ft. broad and 20 ft. long; the sides are carried up a little higher than the roof of the upper deck-house. The same disposition is adopted with the three boiler hatchways, which are side by side amidships and each 26 ft. by 32 ft. Aft of the boilers are galleys, aft of them officers' cabins, and the spacious ward-room

is right in the stern with a balcony overhanging the water. Above this first wooden deck comes another, the space between them being about 9 ft. Forward on this main deck, and so escaping all noise or smell from the engines, are the dining and drawing-rooms of the Czar, with private apartments at the side for the Imperial family. The whole of the deck is surrounded by a covered gallery for promenade. The dining-room will be 65 ft. long, 85 ft. broad, and 12 ft. high, and will, like the other reception rooms, be of unprecedented magnificence. The after-house will contain apartments for the aides-de-camp and ladies-in-waiting, with their saloon overlooking the sides and stern of the vessel. The roof of the covered gallery affords an open promenade, and above the houses another story or set of houses is erected. The upper house forward contains a grand reception-hall and bedrooms for the Emperor and Empress, with cabins for their servants. In the after-house are the study and reception rooms of the High Admiral, the Grand Duke Constantine, with two private cabins for the captain of the ship. The hatchways of the engines and boilers open above the loftiest of these houses, the gigantic cowls for ventilating them rising still higher, with the three great funnels behind them side by side. The flying bridge will command a view above the roof of the highest houses. The height from the keel to the roof of the second storey of the deck-houses will be about 46 ft., or from the inside of the double-bottom 42 ft. 6 in. The yacht will carry three swift steam launches, two lifeboats suspended at the edge of the raft, and other boats. Long rows of steps lead from the deck, and down the sloping sides of the raft to the boats. The yacht will be manned by a crew of 260.

The novel construction of this vessel has naturally excited considerable interest amongst marine engineers and naval architects. By them it is regarded as an experiment, but after her very successful launch, the designer and constructor are probably well satisfied as to the prospects of her future behaviour.

LUMINOUS PAINT.

AMONG recent novelties which have been brought before the public is luminous paint. The possibilities of usefulness which are suggested by a paint giving off a luminous appearance in the dark, have naturally excited much interest, and as there is every probability that it may be made serviceable for marine purposes, a brief notice of the invention will not be out of place in our pages.

The phenomenon of phosphorescence in connection with certain substances has been known for a long period, the substances first absorbing and then emitting light. The explanation of this is that vibratory motion is imparted to the particles of the substance endowed with the property in question by the waves of light to which it may be exposed, the vibration being kept up for a certain time after the withdrawal of the light, and thus producing a luminous appearance in the dark. Until lately this property was known to be only of a character too evanescent to be made practically serviceable, but Mr. W. H. Balmain, a chemist of the London University, after much research and experiment, discovered a combination of phosphorescent substances which was more sensitive to the reception of the exciting waves of light than anything previously known, and in which the action of luminous vibration continued for some hours after the removal of the light. The nature of the combination is not yet made known, and is the subject of a patent, but the effect may be witnessed by any persons interested in Mr. Balmain's discovery, on application to Messrs. Ihlee and Horne, 31, Aldermanbury, London, who are developing the invention in the form of luminous paint.

There are certain points in connection with this paint which must be fully established before it can be largely used for marine purposes. It should be ascertained and stated definitely (1) for how long a period after withdrawal of light will the painted surface remain perfectly luminous; (2) at what distance is the luminosity usefully perceptible; (3) to what extent is the paint affected by lengthened contact with salt water; (4) how long will the paint retain its property without deterioration.

If these questions can all be answered satisfactorily, we do not hesitate to say there is a great future in store for luminous paint, especially as regards its application for marine purposes. Every sailor will call to mind a great number of instances in which it may be made serviceable—buoys, beacons, lifebuoys, lights for magazines and holds, illumination of compass cards, divers' dresses, &c.—and there would seem to be no reason why the hull, masts, funnels, and even sails should not be painted, so as to make every vessel at night a veritable *Flying Dutchman*, warning, and being warned by, other phantom ships. Such an eventuality, however, is not in the immediate future: navigation is not yet prepared for the apparition of a fleet of ghostly cruisers upon the ocean; but it cannot be denied that if approaching vessels could indicate to each other how they were heading at night, it would certainly lessen the risk of collision, an advantage too obvious to be enlarged upon.

One ingenious adaptation of the invention is that of the Aladdin's lamp. This consists merely of an oblong surface about 18 in. by 12 in., painted over, which, when taken into a perfectly dark chamber after exposure to daylight, yields sufficient light to show the pattern of the wall paper, &c. Two or three of these luminous surfaces will give a really serviceable light, and are in actual use on board H.M.S. *Northampton* and *Comus* in the magazines and spirit rooms. For such purposes their value is very evident.

At present we understand that the cost of the paint is 28s. per lb., but it is anticipated that an increased demand will before long enable the price to be lowered, it being made at present only in small quantities.

LIGHTS AND FOG-SIGNALS.

THE new Regulations for Preventing Collisions at Sea come into force on the 1st September, except that part of them (Art. 10) referring to the lights, &c., of fishing vessels, the operation of which is postponed for a year. We gave the text of the new Regulations and the Article relating to fishing vessels, which is to remain in force for another

year, in our numbers for October, 1879, and April, 1880, respectively; they can now be obtained at any Board of Trade or Mercantile Marine Office. Our present purpose is not to comment upon the new Regulations, which are indeed so plain as to need no comment, but to make the new departure an opportunity of describing the whole of the *materiel* with which ships should be provided, in order that they may be in a position to make the proper lights and fog-signals necessary at sea. Much of what we have to say is given in "Instructions to Board of Trade Surveyors," and the rest in official circulars obtainable by anyone, but the information upon the subject is so scattered, that few shipowners or shipmasters have that exact knowledge which is desirable in these days of frequent collisions. We shall describe in detail the lights, &c., required in ships, remarking when any feature of it is subject to alteration by the new Regulations.

Side Lanterns.—The Regulations require that the coloured side-lights shall be visible at a distance of two miles on a clear, dark night, and show a clear and unbroken light over ten points of the compass. Experience of trials has been the basis upon which the Board of Trade from time to time has prescribed the dimensions of lanterns necessary to meet this requirement. The back and side of the lantern should each be not less than 9 inches, the height not less than 11 inches (exclusive of the chimney). The burner must be not less than 1¼ inches, for colza oil, or 1 inch for paraffin. The coloured lens must not be less than 5 inches high, and its chord must not measure less than 8 inches. The horizontal section of the lens should be of a curvature not less than a third of a circle. As to the quality of the lens, a plain, thin glass will not do, and is not passed unless the lamp is exceptionally good in other respects, that is, as regards burners or reflectors. The kind of lens now in most general use is the dioptric; in passing through it the rays of light are all refracted into a zone parallel to the surface of the water. To be efficient, a dioptric lens should be of proper transparency; this object is sometimes attained by the colour being merely a surface film; sometimes there is a white dioptric lens with a thin coloured glass inside. In the latter case, either the coloured glass should

be at some distance inside and detached from the lens, or some other precaution should be taken to prevent the smoke of the lamp being deposited between the two. The colour of the green lens should rather be a bluish green than a yellow green; the latter is apt to be misleading in a foggy atmoshere. There is no prescribed size for the reflector; it should, however, be as large as practicable, and its shape should be such that a horizontal section of it is a large arc of a circle, and the vertical section an arc of a parabola. The common circular reflector, made of flat, or nearly flat, piece of metal, is inefficient. A most important point is the position of the burner as regards height; the centre of the flame, the centre of the lens, and the centre of the reflector should be all at the same height. In a lamp constructed to burn either colza or paraffin, it should be seen that some arrangement is made to ensure this condition when either burner is used. If the lamp is faulty in respect of height of flame, the dioptric lens, so far from being an advantage, is less efficient than a plain glass. Further, the burner should be not much out of the centre of the curve of the lens. This curve, as we have said, should be about a third of a circle. If the burner be too near the lens, the light will show more than the prescribed two points abaft the beam of the ship; if too far away from the lens, the light will not show so far as the two points. The burner being too near the lens is a common cause of the cracking of the latter. The Board of Trade Instructions do not insist upon duplicate side lamps, but sea-going ships are not absolutely safe unless they either have them or a relieving lamp, having two lenses.

Position and Screening of Side Lights.—The side lights must show a clear and unbroken light from right a-head to two points abaft the beam. The Board of Trade Instructions do not now prescribe any position for the side lamps, but they must be so placed that neither sails, davits, rigging, nor anything else can obscure them. When they have protecting cages, no bars of any kind should cross in front of the lens. The lights should be screened on their fore-side for a length not less than three feet. In large sailing ships the side lanterns are often carried in cages

attached to the ship's bulwarks; in this case a screen should be so attached to the ship's side, that its fore-end (at not less than three feet from the fore-side of the lamp) and the inner edge of the wick of the lamp shall be in a fore-and-aft line. The same thing must be secured when the screen forms a box for the lamp; if the screen be supported by stanchions passing through the rail, their lower ends should slip into sockets in the covering board, so that when they are shipped, the screen falls naturally into its true position. If it be necessary to throw the screens out by means of davits, the davits should either have stop-pins or stays to ensure that the screens when in place, cut off the light in a fore-and-aft line. The essential point with all fittings whatever, is that when they are in place the screens remain in a fore-and-aft line without any kind of lashing. Small sailing vessels under 80 tons gross registered tonnage are permitted to carry their screens secured to the rigging if they cannot be carried on stanchions. This is the only exception admitted, all other vessels must either have them on stanchions or davits, or on some fixed and rigid part of the structure of the ship.

Masthead Light in Steamers.—This must be so constructed as to show a bright white light for a distance of five miles, and to be a uniform and unbroken light from right a-head to two points abaft the beam on each side of the ship. There is no prescribed size for this lamp or for its burner. Practically, it is usually of as large dimensions as the side lanterns, and the remarks as to the position of the burners in them apply with equal force to it. By the old regulations it was to be carried at the fore-masthead; by the new, it may be on, or in front of the foremast, but must be at a height above the hull not less than 20 feet, nor less than the breadth of the ship, if that breadth exceed 20 feet. To secure the light showing through the proper range the lantern should be carried on a fork either attached to the foremast or to a metal tube running up a stay; the lamp also must be so carried as not to be obscured by any of the sails of the ship. It is desirable for a steamer to have a duplicate masthead lantern, as if she has another vessel in tow she should show a second masthead light set above the other.

Anchor Lantern.—The Regulations say of this that it must be not less than 8 inches in diameter, must show all round for at least a mile, and must be carried at a height not exceeding 20 feet above the hull of the ship. The Board of Trade Instructions prescribe further that the globe should be at least 5 inches high, that the burner should not be less than $1\frac{1}{4}$ inches for colza oil or $\frac{3}{4}$ inch for paraffin. If the glass of the anchor lantern be dioptric, the centre of the burner must be at the same height as the centre of the glass.

Ships' Lights when not under Command.—The new Regulations provide for the case of vessels employed in laying telegraph cables, or which from an accident are not under command. Under such circumstances steamers are not to carry a masthead light, and either sailing ships or steamers are required to carry three red lights in globular lanterns, each not less than 10 inches in diameter, in a vertical line one over the other, and at intervals of not less than 3 feet. This is quite a new provision, and we have not heard of any action having been taken by the Board of Trade in respect of it, but it would appear that as all ships are liable to disabling accidents, at least all sea-going ships should be provided with red globular lanterns, such as we have described.

Fog-horn.—The new Regulations require an efficient fog-horn to be sounded by a bellows or other mechanical means. This provision excludes the old-fashioned mouth-horn altogether. Many bellows fog-horns are not efficient, for the reason that the bellows does not open far enough, and thus the blast of the horn is too short. In other cases the horn is very short and consequently the sound produced by it is not louder than an ordinary mouth-horn. The only other kind of mechanical horns at present in common use are Holmes's Compound Reed Horns, commonly known as "Telescope Horns." They certainly produce a loud and clear sound, but require very careful usage. Being made of thin tin they are very liable to get damaged by rust and a dent may disable the horn. For protection they are sometimes encased in basket work. Another objection to them is the very considerable amount of labour involved in blowing them. A thoroughly good fog-horn, producing as good a sound as Holmes's, but less liable to

get out of order and worked more easily, would be a great boon to vessels in the North Atlantic trade.

Bell.—An efficient bell, by the Board of Trade Instructions, should not be less than 8 inches in diameter, and should be so hung that the sound may freely spread in all directions round the ship.

Steam Whistle.—This also should be so placed that its sound be not obstructed. It is required to be at least 8 feet above the deck, and to be forward of the foremost funnel.

Fishing Vessels.—The old Regulations as to fishing vessels remain in force till September, 1881. It may be as well to remark, however, that by a decision of a Court of Inquiry, in the autumn of last year, it was held that the white light required to be shown by fishing vessels, when attached to their nets, should be at least as efficient as the globular anchor lantern, described under that head.

CORRESPONDENCE.

COLLISIONS IN FOGS.

To the Editor of the "Nautical Magazine."

Sir,—A collision in a fog is a catastrophe that has been dreaded as one of the worst modern dangers the navigator is liable to, and with steamers increasing in numbers so rapidly the liability to such a danger increases every day. The late collision in a fog between two large Atlantic steamers, whereby one of them, if not both, with many hundreds of lives, were placed in jeopardy, calls loudly for some means to lessen the risk, and a code of signals by means of the steam-whistle and fog-horn would, in my opinion, tend very much to that end. All steamers are now fitted with very good whistles, and so much improvement has, of late years, been made in the mechanical fog-horns, that signals could be made with ease and tolerable precision between vessels a considerable distance from each other, and in sufficient time to d a collision that might otherwise possibly occur.

The system on the principle of the Morse Alphabet in telegraphy, as seen at the end, could easily be learned in a short time by the master and officers, each having a printed card of them always at hand for reference, as well as one in the wheelhouse and binnacle. I have myself on more than one occasion been in a thick fog with hundreds of passengers on board, once with over eight hundred, and would have felt truly thankful to know that there was a way for me to proceed with comparative safety from collision. The signals are to denote the course the vessel making them is steering, with a few sentences that would likely, from time to time, be required. Something more may suggest itself to other heads, but, for my own part, I do not think any more would be necessary, for the simpler the better. The speed is regulated by the Legislature to "moderate" in a fog, and although this would not be the same in all vessels, having an approximate idea of it would be sufficient in manœuvring, should that become necessary.

The nature of the signals, like the flags in the Commercial Code, is such that the first two blasts would denote the quadrant of the compass in which the course lay, which, besides simplifying it, would tend to prevent mistakes being made; for instance, the points from North to E. by N. inclusive commence with a short and long blast, the short to be, say, two, and the long six seconds, with a two-second interval between. East to S. by E. inclusive with two short blasts; South to W. by S. inclusive with a long and short blast, and West to N. by W. inclusive, with two long blasts. This is perhaps not the best code; cleverer heads could possibly name a better, and I should be glad to have the views of some of my brother shipmasters on the subject, through the medium of the *Nautical*, as well as feeling much obliged if you could insert this in your next number.

The New Regulations for Preventing Collisions at Sea come into force on the 1st of September, and as the 12th Article of them enacts that a sailing vessel when in a fog is to make two or three prolonged blasts, according to the wind she would have, corresponding somewhat to the West and W. by N., point signals. It may be thought perhaps by some that this would only confuse matters,

but from my experience, both in sailing and steam vessels, the prolonged blasts are continued so long, 20 to 30, and even 40, seconds, that the difference is too great to allow of a mistake being made. Perhaps you would also give your numerous readers the benefit of your valuable opinion on the subject.

Yours truly,

A MASTER IN STEAM FOR TEN YEARS.

P.S.—I may mention that when nearly through with my letter I was shown a description of an improved code and apparatus, patented, I believe, by Mr. W. B. Barker, of Hoboken, U.S.A., but which in no way changes my view of the suitability of the present code.

Proposed Code of Sound Signals for Fogs.

North	. —	East	. .	South	— .	West	— —
N. by E.	. — .	E. by S.	. . .	S. by W.	— . —	W. by N.	— — —
N.N.E.	. — —	E.S.E.	. . —	S.S.W.	— . .	W.N.W.	— — .
N.E. by N.	. — — —	S.E. by E.	. . — .	S.W. by S.	— . . .	N.W. by W.	— — . —
N.E.	. — — .	S.E.	. . . .	S.W.	— . . —	N.W.	— — — —
N.E. by E.	. — . —	S.E. by S.	. . . —	S.W. by W.	— . — .	N.W. by N.	— — — .
E.N.E.	. — . .	S.S.E.	. . — —	W.S.W.	— . — —	N.N.W.	— — . .
E. by N.	. — . . .	S. by E.	. . — — —	W. by S.	— . — — —	N. by W.	— — . . .

. . . . . What course are you steering?

— — — — — Repeat signal, I have not understood you?

— All right, or your signal has been understood.

. . . — — — I am anchored in a current running as per following sig (course of current to follow).

[Our correspondent is perhaps not aware that numerous propositions have, from time to time, been brought forward for a code of sound signals for use in fog, similar in principle to that indicated by him. The practical experience of seamen generally is, however, not in favour of such refined distinctions as are involved by utilising combinations of long and short symbols, whether by means of sound or light. It is feared (and we think with reason) that although such a system may be quite intelligible and appear extremely simple when studied in cool blood, yet in times of

emergency when emotion, fear, or a multiplicity of other considerations are occupying the mind, the proposed system would be thrown entirely out of gear and thus the condition of things would be confusion worse confounded. We have hitherto refrained from inserting communications addressed to us on this subject, holding the opinion that the adoption of any such scheme as is proposed would have a mischievous rather than a beneficial influence, and that no good purpose is served by giving publicity to proposals of such questionable utility. Our correspondent, however, makes a sort of appeal to his brother shipmasters and to ourselves, and therefore we insert his letter, but desire emphatically to state that we have no faith in the practical value of his or any other similar scheme of sound-signals.—Ed. *N. M.*]

ANSWERS TO CORRESPONDENTS.

Method of Working Longitude by the Aid of the Azimuth Tables: —We thank our correspondent "N. P. M." for his communication. Finding time by the azimuth, &c., of a body, is not a new problem, and the publication of Tables such as he describes would serve no useful purpose.—Ed. *N. M.*

BOOKS RECEIVED.

Tables relating to Life Salvage on the Coasts of the United Kingdom during the year ended 30th June, 1879. Issued by the Board of Trade, May, 1880. London: Eyre and Spottiswoode, Queen's Printers.

Voluntary effort and Government action go hand in hand in the humane business of saving the lives of those who are wrecked upon our shores. The Royal National Lifeboat Institution, with its extensive organisation, supported by the spontaneous charity of the general public, has, since its establishment, been the means of saving a great number of lives; and on the other hand the action of the Board of Trade in connection with the rocket life-saving

apparatus has also proved exceedingly effective, for by means of the apparatus many lives have likewise been rescued from vessels stranded on our coasts. The little book of tables now before us gives the number of lives saved by the different means in operation; also a list of places on the coasts of the United Kingdom where there are means for rescuing the victims of shipwreck, such as lifeboats, rocket apparatus, cliff ladders, belts and lines, &c. It appears that in the year 1878-9, 449 lives were saved by lifeboats, and 269 by the rocket and mortar apparatus and assistance with ropes from the shore, besides a very large number by other means.

The little pamphlet also furnishes a quantity of interesting information as to the details of the services rendered, and is prefaced by an account of the development of the use of the rocket apparatus, written by Mr. Thomas Gray, of the Board of Trade. The publication is interesting and instructive, showing clearly and concisely that, in addition to the valuable results obtained by private effort, a large and effective organization kept up by a Government Department does its work well and fully justifies its existence.

Preparation for the Local Marine Board Examinations. By J. G. Moore and P. E. le Couteur, Teachers of Navigation and Seamanship. Liverpool: Philip, Son, and Nephew. London: Geo. Philip and Son, 32, Fleet Street.

THE authors state that the design of this publication is to supply candidates for certificates of competency of all grades, with the necessary information as to what they require to learn in order to qualify for the Local Marine Board Examinations. In this object we think they have succeeded, for with the aid of this book, a candidate can find out what he has to learn, which for him is an important step. So far as concerns its limited purpose, the arrangement of the work is simple and compendious, but it must be regarded only as a sort of primer and not as a text-book. The inference to be drawn from the construction of the work is, that a candidate after reading it is ready to go to a nautical school, which perhaps is one of the motives the authors have had in view,

but we are bound to say that the form and scope of their little work afford some indication that the method of education adopted by the authors is satisfactory, and no doubt this will operate to their advantage.

The Origin and History of the Union Jack. Printed and published by Joseph Mansell, 35 & 36, Red Lion Square, London, W.C.

This publication consists of a folding card containing on one face an account of the Origin, on another the History of the Union Jack, and a third face is occupied with an acrostic. The chief feature, however, is on a fourth face, and consists of an ingenious arrangement of the three crosses of St. George, St. Andrew, and St. Patrick, by which the construction of the flag is at once made apparent, and yet each cross can be made to show itself separately. This is certainly useful, conveying clearly what it professes, and is certainly worth the sixpence which the whole thing costs. We have not much to say in favour of the letter-press giving the Origin and History of the Union Jack, and do not care to say all we think about the acrostic. We can only apply the remark of some eminent joker, that the Origin and History represent "prose," but the acrostic is "worse."

A Description and List of the Lighthouses of the World. By Alex. G. Findlay, F.R.G.S., &c. Twentieth Edition. With which is incorporated *A List and Description of Coast Fog-Signals: Their Positions and Character as applied to General Navigation,* with an introductory account by E. Price Edwards. London: R. H. Laurie, 53, Fleet Street. 1880.

Findlay's "Lighthouses of the World," is a work too well known and valued to require much praise from us, but, nevertheless, we would say to those who do not possess the book, that it contains accurate information on matters of great moment to all sailors, and that it is specially serviceable as a work of reference. The list of lighthouses is in this edition corrected to the beginning of the present year, and the publishers undertake each year to furnish purchasers with a supplement containing the additions and changes made in 1880, 1881, and 1882.

A novel feature in this twentieth edition, is the list and description of coast fog-signals which has been introduced. The system of employing sound for conveying warnings to the navigator in thick weather is a comparatively new branch of coast marking, and has of late years been much developed by reason of the great increase of steam shipping in all parts of the world. The publishers have, therefore, we think, done wisely in supplementing their list of lighthouses with a list of fog-signals, for it cannot be doubted that with increased sea traffic the necessity will arise for increased facilities for navigation, and that the sound-signal system now inaugurated is destined ere long to be largely developed and extensively applied. The introductory account, written by Mr. Price Edwards, is worth reading, the author evidently being exceedingly well informed upon the subject. He treats of (1) Fog, its nature and meteorological conditions; of (2) Sound, and its relation to the atmosphere; and (3) of Instruments employed for producing loud sounds, the last part being illustrated with some neat woodcuts. We have only to say in regard to this account, that, as far as we are able to judge of so technical a matter, the information given is full and accurate, and is certainly most interesting. In the part devoted to instruments, the author tells us about bells, gongs, guns, explosive rockets, whistles, reed horns, and sirens, why one instrument is considered better than another, and what are their distinguishing features, information of the greatest interest and utility to nautical men. But there is one point on which we think the author might have insisted more strongly than he has done, and that is the uncertainty attending the very best sound-signal. On one day it may be heard ten or even twenty miles, on another it can only be made out with difficulty at two miles. Mariners must therefore beware, and not trust implicitly to hearing fog-signals at short distances. The one admonition which the hearing of the fog-signal should always convey to the mariner, is "keep away," it should never be used for leading purposes, but should be regarded as a warning only. The list of fog-signals appears to be complete, and enables us to see what is being done in this respect by other nations. On the coasts of

the United States and British North America there is a very large number of fog-signals of various kinds, which is accounted for by the existence there of exceptional physical conditions favourable to a somewhat abnormal development of fog, and also to the fact that the coasting traffic on those coasts is exceedingly large, and is carried on by a people who will not be stopped by fog.

Mr. Price Edwards concludes his interesting memoir thus :—
"The effort to cope with the seaman's greatest enemy fog, is like the provision and maintenance of other guiding and warning marks dictated by the higher feelings of humanity ; and the writer rejoices in the opportunity he now has of showing how successfully this new branch of the science of coast marking has been developed, and how much the mariner owes to the care and forethought of the authorities on his behalf in this matter. Extended experience will no doubt bring with it changes, improvements, and further developments, which in some future edition of this work will doubtless be duly chronicled, but in the foregoing remarks the writer has endeavoured so to give the necessary information to mariners that fog-signals, as now established, may be intelligently employed by them, and that thus he may in some slight degree contribute to the safety of coast navigation."

A Treatise on the Law of Merchant Shipping and Freight. By Jas. T. Foard, Barrister-at-Law. London: Stevens & Sons, 119, Chancery Lane ; and Waterlow & Sons (Limited), London Wall. 1880.

A NOTABLE difference between the treatise now before us and many other text-books on merchant shipping law, is that Mr. Foard has endeavoured to give the reader an insight into the principles and motives underlying the written code, thus assisting him materially in comprehending the significance and application of the laws themselves. To pick the dry bones of mere law is an irksome and often unprofitable task for the unprofessional reader, who becomes wearied with the repeated iteration of words and phrases having no living interest for him, the sense of which

he gathers only by dint of the most strained application. Mr. Foard has, however, judiciously combined with the letter that killeth the spirit that giveth life, and consequently his exposition is more agreeable than many legal treatises. He has, moreover, ignored the strictly technical style, and has given to the shipping community a work which he who runs may read, and he who reads may understand. The desire of the author is stated to be that his treatise may serve as a practical synopsis of, and therefore a useful book of reference for, that portion of merchant shipping law which regulates the employment of ships and the earning of freight. The subject of ownership is dealt with at some length, and although the author goes over ground which has been well trodden by many legal writers before, it must be said that his treatment is comprehensive and original in its method. It would be an excellent thing if all persons holding shares or fractions of shares in ships, would study the law as expounded by Mr. Foard in regard to owners' rights and obligations. It would be of the greatest value to many whose money is now invested in shipping property, but who know very little about the law affecting the holding of such property. The duties and responsibilities of a "managing owner" are clearly stated, and co-owners may learn exactly what are his duties, and what is the extent of his power. Mr. Foard's treatment of the subject of General Average is interesting chiefly on account of the number of foreign cases cited, showing the practice which obtains in different countries. We observe that no reference is made to the recent movement in favour of making the regulations known as the York and Antwerp Rules the subject of international agreement, a movement which has obtained a very large measure of support.

The chapters on bargain and sale of ships, and mortgages, we would also commend to the careful attention of all interested in ships, as they contain much serviceable information. The chapter on the master as agent, treats of sundry matters in which the master acts directly for the owners. Some of the matters referred to might, with advantage, be more fully treated, as for instance the master's obligations in respect of employing a pilot, and the relationship in which he stands to the pilot. This important subject has a

direct bearing on the safe arrival in port of the ship and cargo, and is, to our mind, dismissed with a too scanty notice; as is also that of the master's responsibilities in regard to the engagement of and his relationship to the officers and crew, which of late years have been hedged round with numerous legislative enactments.

The second part of Mr. Foard's book is devoted to questions concerning the earning of freight, chiefly in regard to the interpretation and construction of the contract by charter-party and the express terms of such documents; and also as to the legal effect of bills of lading. With these points we are bound to say Mr. Foard deals in a manner which cannot fail to make his work invaluable to merchants and shippers, and which will put owners and masters in full possession of knowledge as to their powers and responsibilities.

The whole work is marked by extreme care in its preparation, and bears evidence of surprising industry on the part of the author. The vast number of cases cited, and the inclusion of all the most recent decisions of the American as well as of the English Courts of Law on various points, largely increases the value of the work for reference purposes, and we are glad to place on our book-shelf a volume of so much interest and importance, which cannot fail to take a prominent place among the standard works on merchant shipping law.

Regulations for Preventing Collisions at Sea.—Fog Signals.—Bells.—It has been intimated to the Board of Trade through the Foreign Office that, on the ground that it is against their religion to use bells on board ship, the Turkish Government object to the use of bells as fog-signals either in the Imperial or Mercantile Navy of that country, but that they have no objection to the use of drums in lieu of bells. They will therefore make the signals on drums that are in sailing ships of other nations made by bells. The Board of Trade therefore hereby give notice that in all cases where the Regulations require a bell to be used, a drum will be substituted on board Turkish vessels.

TIDE TABLES FOR AUGUST, 1880.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M.	London Bridge. P.M.	Hull. A.M.	Hull. P.M.	North Shields. A.M.	North Shields. P.M.	Leith. A.M.	Leith. P.M.	Devonport. A.M.	Devonport. P.M.	Dover. A.M.	Dover. P.M.	Weston-super-Mare. A.M.	Weston-super-Mare. P.M.	Liverpool. A.M.	Liverpool. P.M.	Greenock. A.M.	Greenock. P.M.	Queenstown. A.M.	Queenstown. P.M.	Kingstown. A.M.	Kingstown. P.M.	Londonderry. A.M.	Londonderry. P.M.	Brest. A.M.	Brest. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
S	1	9 53	10 33	2 13	2 50	11 57	—	10 50	11 25	0 48	1 20	6 54	7 33	2 3	2 54	7 22	8 0	7 52	8 32	0 38	1 18	7 11	7 46	4 26	4 56	—	0 20
M	2	11 12	11 49	3 26	4 0	0 32	1 4	11 57	—	2 9	2 47	8 10	8 41	3 34	4 9	8 35	9 3	9 8	9 38	1 56	2 29	8 20	8 50	5 23	5 47	0 56	1 25
Tu	3	—	0 18	4 29	4 55	1 31	1 55	0 25	0 49	3 22	3 52	9 8	9 32	4 41	5 10	9 28	9 51	10 6	10 31	2 58	3 24	9 18	9 44	6 9	6 31	1 52	2 16
W	4	0 46	1 8	5 18	5 38	2 17	2 37	1 11	1 32	4 19	4 43	9 55	10 17	5 36	5 58	10 12	10 31	10 53	11 14	3 47	4 8	10 6	10 25	6 52	7 12	2 37	2 56
Th	5	1 29	1 49	5 57	6 16	2 56	3 13	1 52	2 10	5 4	5 23	10 38	10 57	6 19	6 39	10 49	11 7	11 35	11 54	4 27	4 46	10 42	10 58	7 32	7 50	3 14	3 32
F	6	2 7	2 24	6 35	6 53	3 29	3 45	2 27	2 43	5 42	6 0	11 16	11 35	6 58	7 16	11 24	11 41	—	0 12	5 4	5 22	11 14	11 30	8 7	8 22	3 49	4 6
S	7	2 39	2 56	7 10	7 27	4 1	4 17	2 59	3 14	6 18	6 34	11 53	—	7 33	7 50	11 58	—	0 30	0 47	5 40	5 57	11 46	—	8 37	8 52	4 28	4 40
S	8	3 12	3 28	7 44	8 0	4 33	4 50	3 30	3 46	6 52	7 7	0 11	0 29	8 6	8 21	0 15	0 32	1 4	1 21	6 13	6 29	0 2	0 19	9 7	9 22	4 56	5 12
M	9	3 45	4 3	8 16	8 32	5 7	5 25	4 3	4 20	7 23	7 39	0 47	1 5	8 36	8 52	0 48	1 4	1 38	1 55	6 45	7 2	0 36	0 53	9 37	9 53	5 28	5 44
Tu	10	4 19	4 37	8 49	9 6	5 43	6 1	4 38	4 56	7 56	8 13	1 23	1 41	9 8	9 24	1 21	1 38	2 11	2 27	7 20	7 38	1 11	1 30	10 10	10 28	6 1	6 19
W	11	4 53	5 11	9 24	9 42	6 19	6 38	5 14	5 33	8 30	8 47	2 0	2 19	9 41	9 58	1 55	2 13	2 44	3 2	7 56	8 14	1 49	2 8	10 46	11 6	6 37	6 56
Th	12	5 28	5 49	10 2	10 23	6 58	7 21	5 54	6 17	9 4	9 23	2 38	2 59	10 15	10 33	2 32	2 52	3 21	3 41	8 33	8 58	2 28	2 50	11 32	—	7 17	7 41
F	13	6 11	6 38	10 48	11 18	7 47	8 16	6 43	7 11	9 46	10 11	3 22	3 46	10 53	11 17	3 15	3 40	4 4	4 29	9 17	9 48	3 15	3 42	0 8	0 38	8 7	8 35
S	14	7 0	7 29	11 52	—	8 48	9 26	7 43	8 20	10 39	11 11	4 12	4 41	11 48	—	4 9	4 44	4 56	5 28	10 12	10 48	4 13	4 50	1 17	2 1	9 7	9 45
S	15	8 1	8 40	0 20	1 9	10 8	10 51	9 1	9 45	11 48	—	5 14	5 51	0 24	1 5	5 25	6 12	6 4	6 46	11 31	—	5 28	6 9	2 46	3 28	10 29	11 18
M	16	9 25	10 12	1 49	2 30	11 35	—	10 29	11 11	0 33	1 21	6 33	7 18	1 53	2 40	7 2	7 47	7 32	8 18	0 18	1 4	6 51	7 33	4 7	4 42	—	0 5
Tu	17	10 57	11 38	3 12	3 51	0 17	0 54	11 48	—	2 7	2 51	8 1	8 38	3 25	4 7	8 26	8 59	8 58	9 35	1 48	2 26	8 11	8 47	5 18	5 41	0 46	1 22
W	18	—	0 13	4 25	4 55	1 26	1 54	0 20	0 49	3 31	4 5	9 9	9 38	4 44	5 17	9 28	9 54	10 7	10 36	2 50	3 28	9 20	9 48	6 8	6 35	1 52	2 19
Th	19	0 49	1 11	5 21	5 46	2 19	2 48	1 15	1 40	4 34	5 1	10 6	10 32	5 47	6 14	10 19	10 43	11 3	11 29	3 56	4 22	10 13	10 34	7 1	7 26	2 44	3 8
F	20	1 36	1 59	6 10	6 33	3 6	3 27	2 3	2 25	5 26	5 49	10 57	11 20	6 39	7 2	11 6	11 28	11 53	—	4 45	5 7	10 55	11 16	7 49	8 9	3 30	3 52
S	21	2 20	2 42	6 55	7 16	3 48	4 8	2 45	3 5	6 11	6 32	11 42	—	7 23	7 43	11 48	—	0 16	0 37	5 29	5 50	11 36	11 56	8 28	8 46	4 13	4 33
S	22	3 3	3 22	7 36	7 56	4 28	4 48	3 21	3 43	6 58	7 12	0 8	0 24	8 2	8 21	0 8	0 28	0 57	1 17	6 10	6 29	—	0 16	9 4	9 22	4 52	5 10
M	23	3 41	4 1	8 15	[illegible]	5 8	5 27	4 2	4 21	7 28	7 44	0 45	1 5	8 38	8 55	0 48	1 6	1 37	1 56	6 47	7 6	0 36	0 55	9 30	9 56	5 28	5 46
Tu	24	4 20	4 37	8 51	[illegible]	5 40	6 4	4 40	4 59	8 0	8 16	1 25	1 41	9 11	9 26	1 23	1 40	2 13	2 30	7 23	7 40	1 14	1 33	10 12	10 29	6 4	6 21
W	25	4 55	5 13	9 27	9 45	6 23	6 40	5 17	5 35	8 32	8 47	2 2	2 20	9 41	9 56	1 57	2 14	2 47	3 4	7 57	8 13	1 51	[illegible]	10 48	11 8	6 38	6 55
Th	26	5 30	[illegible]	[illegible]	10 21	6 58	7 18	5 51	6 15	9 2	9 18	2 38	2 56	10 11	10 26	2 31	2 49	3 21	3 38	8 29	8 47	2 28	2 48	11 32	11 59	7 14	7 35
F	27	[illegible]	[illegible]	10 43	[illegible]	7 41	8 7	6 37	7 2	9 35	9 53	3 15	[illegible]	10 43	11 5	3 9	3 31	3 58	4 20	9 8	9 31	3 9	3 31	—	0 30	7 57	8 23
S	28	6 52	7 16	11 40	—	[illegible]	9 10	[illegible]	8 5	10 16	10 44	4 0	4 27	11 33	—	3 57	4 24	4 41	5 12	9 58	10 32	4 2	4 31	1 0	1 40	8 51	9 28
S	29	7 47	[illegible]	0 14	0 51	9 50	[illegible]	8 44	[illegible]	11 18	mid.	[illegible]	[illegible]	0 0	0 47	5 7	5 58	5 47	[illegible]	11 10	[illegible]	5 11	5 50	[illegible]	3 10	10 11	10 56
M	30	[illegible]	[illegible]	1 30	2 10	[illegible]	[illegible]	10 0	10 40	—	[illegible]	6 13	6 54	1 30	2 13	6 30	[illegible]	7 11	7 50		[illegible]	6 30	7 10	3 40	[illegible]	11 40	—
Tu	31	[illegible]	[illegible]	[illegible]	3 27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8 11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1 37	7 47	8 21	4 57	5 34	0 21	0 57

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add*, − *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 18	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 8	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 3	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 8	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fécamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Heligoland	+0 21	Dover
Holyhead	−1 12	Liverpool
Holy Island harbour	−0 58	N. Shields
Honfleur	+5 42	Brest
Inverness	−1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 13	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 43	London
Youghall	+0 13	Queenstown

THE NEW FRENCH MERCANTILE MARINE BILL.

The following is the text of this measure, which has passed the Chamber of Deputies:—

Article 1.—The right of free pilotage is granted to all sailing vessels not measuring over 80 tons, and to steamers whose measurement does not exceed 100 tons, whenever they run regularly between port and port, and habitually frequent the entrances to rivers. Nevertheless, at the request of the Chamber of Commerce, and after an inquiry in the usual form has been made, the public administrative regulations shall determine the modifications of rules which may be considered necessary in the interest of navigation.

Article 2.—For foreign-going vessels the visit of inspection prescribed by Article 225 of the Commercial Code for a fresh cargo loaded in France shall not be obligatory unless six months have elapsed since the last inspection, except the vessel may have sustained damage.

Article 3.—For the official documents or *procés verbaux* showing the changes of owners of the ship, either totally or partially, a fixed charge shall be made for registration of 5 fr. No. 2 of the law of the 28th February, 1872, is repealed so far as is contrary to the present provision.

Article 4.—To compensate shipbuilders for the charges fixed by the Custom House tariff, the following allowances shall be made to them for gross tonnage:—For iron or steel vessels, 60f.; for wooden vessels of 200 tons or more, 20f.; for wooden vessels of less than 200 tons, 10f.; for composite vessels, 40f.; for engines placed on board steamers and for auxiliary apparatus, such as steam pumps, donkey engines, winches, ventilators worked by machinery, also boilers and connecting pipes, 12fr. per 100 kilog.; ships planked with timber, having beams and ribs of iron or steel, are to be considered as composite vessels.

Article 5.—Every change in a ship by which an increase in measurement is gained shall give right to a bounty based on the above tariff according to the increase of tonnage gained. A similar bounty shall be granted for driving engines and auxiliary

apparatus placed on board after completion of the ship. On change of boilers the owners shall be allowed a compensation allowance of 8f. per 100 kilogrammes on new boilers without the tubes if of French make.

Article 6.—The fees granted by articles 4 and 5 shall be paid on delivery of the ship's register by the Receiver of Customs at the port nearest to the place of construction.

Article 7.—The regulation of admission in bond fixed by Article 1 of the law of the 19th May, 1866, and by Article 2 of the law of the 17th May, 1879, is abolished.

Article 8.—Shipbuilders shall receive allowances for vessels on the stocks at the time when the present laws shall come into force as stipulated in Articles 4 and 5, after deducting the amount of Customs' dues fixed by the conventional tariff on foreign imports which may have been entered in bond for shipbuilding purposes.

Article 9.—As compensation for charges imposed on the mercantile navy for recruiting the military navy, a navigation bounty shall be granted during ten years from the date of publication of this law to all French vessels, sailing or steam. This bounty is applicable only to foreign-going vessels. It is fixed at 1fr. 50c., per registered ton, and per 1,000 miles run for vessels fresh off the stocks, and decreased annually by 0·075fr. for wooden vessels, 0·075fr. for composite vessels, 0·05fr. for iron vessels. The bounty is increased by 15 per cent. for steamers built in France according to plans approved by the Marine Department. The number of miles run is calculated according to the distance from the point of departure to the point of arrival, measured on a direct maritime line. In case of war, merchant ships can be requisitioned by the State. Vessels used for fishing, those belonging to subsidised lines, and yachts are excepted from receiving a bounty. Twenty per cent. from the bounty granted by the present law shall be deducted and paid into the "Caisse des invalides" of the Marine, so as to increase the retiring pensions of registered seamen.

Article 10.—Every master of a vessel receiving a bounty, fixed by Article 9 of the present law, shall be obliged to carry, free of charge, mails put under his charge by the Post-office authorities,

or which he will deliver to their administration as prescribed in the consular decrees of the 19th Germinal, year X. If a Post-office agent is deputed to accompany the despatches, he shall also be conveyed free of charge.

Article 11.—A regulation of public administration containing a special statement of the distances between ports shall fix the system on which this law shall be applied.

[In our next number we shall discuss the general effect of this law on British trade and shipping.—Ed.]

THE ROYAL VICTORIA AND ALBERT DOCKS.

THE new extension of the Victoria Dock, henceforth to be known, by the Queen's permission, as the Royal Albert Dock, while the old dock is to be called the Royal Victoria Dock, was opened with much ceremony on 23rd June last. In a few weeks the dam which at present separates the two docks will be pierced and the whole will form a magnificent series of basins $2\frac{3}{4}$ miles long, having a water area of 175 acres. The new docks save great ships four miles of river navigation, and save the dangerous rounding of several points on the river immemorially associated with damaging collisions. Steamers have grown in size till their dimensions are only restricted by the capacities of the harbours at each end of their voyage. The new docks will increase the facilities which London offers to such ships, and may enable the Thames to vie with the Mersey in the size and magnificence of steam shipping. The entrance lock is 500 ft. long by 80 ft. wide, and has four pairs of wrought iron gates, made at Birkenhead, by Messrs. Brassey. The depth of water at the sills is 30 ft. at Trinity high water—that is, at the high-water of ordinary spring tides. Beyond the lock is a porch, or entrance basin, of about 12 acres, where passenger ships will take their living freight on board. A passage 300 ft. long by 80 ft. wide, spanned by a swing-bridge, leads into the main dock. The main dock is about $1\frac{1}{4}$ mile long, and has an

uniform width of 490 ft. The depth will thus admit the largest merchant ships and any of the ironclads built on the Thames. Four millions of cubic yards of soil have been taken out, and a little more than 10 per cent. of this, being perfectly pure gravel, was mixed with Portland cement and put back in great blocks to build the walls of the docks. Thus there are half a million cubic yards of concrete, of which 80,000 tons are Portland cement and the rest is gravel merely changed in position. There is very little stone. It is only used in the sills for the gates and one or two other places. The floors of the entrance passages are of brick. The walls of the dock are about 40 ft. high, 5 ft. thick at the top, and 19 ft. thick at the base. Iron bollards to fasten ships to are placed at intervals of 60 ft. at the tops of the walls and flush with them. The common interlacing of ropes and chains straggling from the ships' sides to bollards half across the quay is thus avoided. The quay is planked like a railway platform, and down the centre of it runs a line of rails, for as much as possible in these docks will be done by steam and hydraulic power. Beyond the platform of the quay come the sheds for the reception of goods. They are respectively 360 ft. long by 120 ft. broad, and so occupy each about an acre of surface. The floor of the sheds is planked. The sides and roofs are of corrugated iron. On the north side alone their number is 16, of which 14 are in one line and two at the angles. When the doors of the great warehouses are opened the view right down the interior offers a curiously vast perspective. Some of these warehouses are already used as granaries for the overflow of wheat from the Victoria Dock. The railway trucks were alongside them yesterday. Standing on metals 3 ft. 3 in. below the level of the boarded floors, the trucks were loaded and unloaded with the greatest ease as from a railway platform. Beyond the row of rails which come close up to the warehouses are two other lines of rails, joined with the first by many sets of points. There are also roads for carts and covered approaches for them to reach the ships' sides or the warehouse doors. In openings here and there the hydraulic pipes and those for conveying drinking water to the ships throughout the docks were exposed to view. There are 36 hydrants, constructed on a

novel principle by Sir William Armstrong's firm. Most of the machinery is by the same firm. There are three steam centres for distributing hydraulic power, and the pipes will also ultimately be connected with those of the Victoria Dock. The hydraulic cranes travel by wheels along the quay. They are arched below, so that a truck can pass beneath, and so they offer also no obstruction to the view. The man who works the crane has his look-out box on the side turned towards the ship.

On the south quay may be seen the two great dry docks, large enough to take the *Orient*, the *Arizona*, and most ironclads. The dry docks are approached by an angle of 45 degrees, so that a vessel glides into them on her way up the dock, instead of having, as is often the case, to turn at right angles to the quay to enter. The larger dry dock is 502 ft. long, with a width between the copes of 85 ft., which diminishes by gigantic steps to 62 ft. at the floor level; the sill is 22 ft. deep, and the floor 3 ft. below the sill. The smaller dock is 410 ft. long, and has a width of 77 ft. and 54 ft., with the same depth. Hereabouts the great main basin brings its 6,400 ft. of length to an end, and is to be connected by a passage 80 ft. wide with the Victoria Docks. The Thames gate of the docks is close to the great gasometers of Beckton, but the new dock will be lighted throughout by the electric light. The company have contracted with Messrs. Siemens Bros. for this work, which will be effected by 28 or 30 lamps, each of 6,000 candle power, placed on poles 60 ft. or 80 ft. above the quay level, and worked by engines at four stations. This light will enable ships to be loaded or unloaded at night in cases of necessity, and of course any acceleration in despatch of vessels is of great importance now that they represent so large an outlay of capital, on which interest has to be paid by continuous earning of freight. Docks are similarly illuminated by electric light at Blackpool, and the same system is to be adopted, we are told, at Holyhead Harbour and at Barrow. The effect of the lofty lamps is said to be very beautiful, and the light similar to moonlight. The Lontin and the Brush light (the latter belongs to the Anglo-American Company) are to be tried in the Victoria Dock.

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, *High Holborn, London, W.C.;* 6, *Lord Street, Liverpool; and* 10, *Erskine Street, Leicester.*

ENGLISH (APPLICATIONS).

2413. Paul Kyle, Southend. "Raising sunken ships and other submerged vessels and substances."

2432 James Mitchell Sim, 323, High Holborn, London. "Improvements in or relating to ships' binnacles and lamps, part of which invention is applicable to other purposes."

2463. John Wallace D. McDonald, Bembridge, Isle of Wight. "Improvements in davits for carrying and stowing ships' boats."

2498. Hermann Hirsch, London. "Improvements in naval constructions, viz., in the shaping and constructing of bodies which move in or through water, especially of hulls of vessels, of propellers, and of rudders."

2522. Hugh Smith, Glasgow. "Improvements in building iron and steel ships or vessels and other structures, and in hydraulic riveting machines and other apparatus employed therefor, parts of the said improvements being applicable to punching machines."

2537. John Galley Hartley, Billiter Street, London. "Improvements in the construction of the decks and other parts of ships, which invention is also applicable for the flooring of houses and for similar purposes."

2553. Henry Patterson Boyd and William Hooley, both of Southampton, and Thomas T. Pearson, Gateshead. "Improvements in the means of propulsion of steam vessels, and in apparatus therefor."

2611. John Calvin Thompson, Roslyn, Queen's County, New York, U.S.A. "Improvements in means or apparatus to be applied to berths and other articles on board ship to retain them in a level position."

2641. Henry F. Brion, Peckham Rye, Surrey. "An improved method for raising sunken ships or vessels and other submerged

bodies, raising and lowering and transporting heavy weights, and also for loading and unloading vessels or ships, railway trucks or waggons, or other vehicles."

2649. Benjamin King, Paris, France. "A combined seat and life-saving apparatus for use on board ships." (A communication.)

2670. George C. Pulford, London. "Improvements in the construction of bottles for carrying messages at sea."

2673. John Hayes, London. "Improvements in the means and appliances for obtaining sea water for bathing and other purposes."

2704. William S. Brice, Liverpool. "Improvements in apparatus for 'trimming' ships of grain or other material in bulk."

2712. Henry Hornby, Hamburg. "A new or improved method and apparatus for repairing the after-part of screw steamers and other ships without the use of dry docks."

2713. Digory W. Sargent, Brixton Road, Surrey. "An improved method of raising sunken vessels."

2734. George Wilson, Sheffield. "Improvements in securing armour upon ships, turrets, and other structures."

2766. Terrot Glover, Jun., Sunderland. "Improvements in apparatus for steering ships."

2769. William Bodill, Birmingham. "Improvements in the manufacture of eyelets or circlets, and rings or washers to be employed therewith, and also of ship and sail thimbles and hollow rings for the suspension of curtains and other similar purposes."

2770. Victor Duval de Stains, Pentonville Road, London. "Increasing the speed of the swimmer."

2811. Alfred Austin Rickaby, Sunderland. "An improved cap for ships' masts."

2814. Comte Charles de Bruc, duc de Busignans, Paris. "An improved screw-helm for steamers."

AMERICAN.

228252. William A. Fairbairn, Hyde Park. "A governor for marine engines."

228278. Charles C. Sanderson, Dedham, Mass. "A self-levelling ships' berth."

228317. Matthew Cooney and William Swanston, Chicago. "An apparatus for unloading coal, &c., from vessels."

228470. Thomas W. B. Murray, and Caleb J. Baker, Chicago. "A folding boat."

225593. Samuel A. Bates, Pittsburg. "An elevator for loading and unloading vessels."

228633. Herman Haupt, Philadelphia. "A device for rendering rivers navigable."

229000. Chas. G. Kellogg, Brooklyn, N.Y. "A steam canal boat."

GERMAN.

10294. A Hutchinson and Co., Paris. "Valves in air bags for raising sunken vessels."

NORWEGIAN.

39. V. C. Breckau. "Hand torpedoes."

74. E. Fleischer, Dessau. "A hydromotor for propelling and steering ships."

122. J. J. Kunstädter, London. "A rudder propeller."

PATENTS PUBLISHED.

Propellers.

4515. November 5, 1879. Price 4d. J. L. Cooper, W. Lockwood, and J. Hosie, all of Glasgow, in the county of Lanark. (Not proceeded with.) The propeller consists of two feathering blades secured on the outer end of an oscillating horizontal radial arm swivelling by journals and collars, near the centre in bearings on a large hollow boss, on the lower end of its main vertical shaft.

Davits, Chocks, &c.

4539. November 7, 1879. W. H. Watling, Middlesborough-on-Tees, Yorkshire, Master Mariner. The davits are straightly pivoted on the deck and work in and out in a frame pinned to the deck. The upright parts of the frame are solid, while the horizontal part is double so as to allow the davit to work therein. The latter part is also fitted with spring catches to lock the davits and hold them until the catches are drawn.

Steam Ships and Vessels.

4670. November 17, 1879. Price 4d. Thomas McCarter and Thomas Cooper, both of the City of Londonderry. A screw-propeller is used, and the vessel above the keel is cut through to the height required for the free working of the screw employed, and from this opening the sides of the vessel incline fore and aft to admit of the water passing freely to and from the blades of the propeller. By this means the screw is placed at the middle of the length of the vessel, the engine acting directly on the propeller shaft and the alley and shafting between the engine and the propeller are abolished.

Columbia River Bar.—The following information as to the state of the Columbia river bar is furnished by Lloyd's agents, at Portland, Oregon, under date April 29, in consequence of a report having got abroad that the bar is shoaling. There are always 25 feet, at high water at this time, upon the shoalest parts of the bar of the south channel; and the bar being smooth, a vessel drawing 22½ feet can cross out. This channel has been shoaling a little; but these shoal areas, arising from sand lumps of recent deposit, must wash out in the month of June, when the Columbia river will be much swollen, or a new opening must be formed, somewhat to the northward and westward of the present outlet. It is in consequence of this shoaling that the north channel has been used more, pilots preferring to cross in smooth water the shoal eastward of Sand Island rather than cross the more exposed parts at the entrance of the south channel. The south channel is crooked, and a vessel is much longer in going out than by the north channel. In the inside of the north channel there are always 22 feet at high water in the shoalest parts across the shoal east of Sand Island, but during spring tides this depth is increased to 22½ feet or 23 feet. North-eastward of this shoal to Cape Disappointment, following the line of the channel, there are from 26 feet to 28 feet. Further seaward, along this channel, the water deepens rapidly to 30 and 35 feet, until the bar proper is crossed.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
256	England — Thames Entrance — North Foreland	Alteration of lights.
257	English Channel—Plymouth Breakwater	Alteration of lights.
258	„ Scilly Islands — St. Agnes	Proposed alteration of light.
259	England—Bristol Channel—Burnham	Change in direction of red sector.
260	„ West Coast—Holyhead Island —South Stack	Alteration in low light.
261	Black Entrance—Sound—Sweden	Signals at Wiken and defective light at Hveen.
262	Baltic—Sweden—Oland Island	Discovery of shoals.
263	Portugal—West Coast—Cape Sines	New light.
264	„ South Coast—Guadiana River —Medo-Alto	Light no longer a leading light.
265	Mediterranean—France—Toulon	Time-ball.
266	„ „ Nice	Alteration in harbour lights.
267	„ Adriatic—Veglia Island —Verbenico	New harbour light.
268	„ Greece—Poros Island	Light in harbour discontinued.
269	North Atlantic—Canary Islands—Tenerife—Santa Cruz	Re-exhibition of Mole head light.
270	Eastern Archipelago—Java—Batavia	Second light on Mole.
271	„ Madura Strait—Bezukie	New harbour light.
272	South Australia—Spencer Gulf	Discovery and marking of shoals.
273	„ Port Adelaide	Alteration of semaphore light.
274	„ „	Alteration of looking-glass beacon.
275	New Zealand — Middle Island — Cook Strait—Cape Koamoroo	Discovery of sunken rock.
276	„ Middle Island — West Coast—Okarito Lagoon	Harbour light discontinued.
277	North America—West Coast—Vancouver Island	A leading mark destroyed and discovery of a shoal.
278	United States—Pacific Coast—California —Fort Ross	Discovery of shoal patch.
279	South America — West Coast — Peru — Iquique	New light on island.
280	„ „ Chile — Antofagasta	New harbour light.
281	West Indies—Trinidad	Position of Darien rock and Delaware bank.
282	„ Haiti—Port-au-Prince	New lights.
283	Central America—San Salvador—Port Jiquilisco	Discovery of shoal ground.
284	United States—Virginia—Cape Charles	Automatic signal-buoy.
285	„ Massachusetts — Stage Harbour, Harding's Beach	New light.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

256.—England.—*Thames River Entrance.—Alteration in the Character of the Light at the North Foreland.*—According to previous notice the light at the *North Foreland*, both as respects the main *white* light and the *red* sector, has been made *occulting*. That is to say, *once in every half-minute* it suddenly disappears for *five seconds*, and then, as suddenly, reappears at full power.

257.—English Channel.—*Alteration in the Colours and Character of the Light on Plymouth Breakwater.*—According to previous notice the colours of the light on the Plymouth Breakwater have been changed from red to *white* towards the *sea*, and from white to *red* towards the *anchorage*. The light now shows *white* from E. by S. ¼ S. round south and west to N.E. ¼ E. from the lighthouse, on a line with the Melampus buoy, and *red* within the anchorage. The light has also been made (in both its colours) *occulting*; whereby, once in *every half-minute*, it suddenly disappears for *three seconds*, and as suddenly reappears at full power. The bell will henceforth be sounded during foggy weather *four times every minute*.

258. — English Channel. — *Scilly Islands. — Alteration in Character of the St. Agnes Light.*—On or about the 1st September, 1880, the character of this light will be altered from a flash every minute, to a *flash every half minute*.

259.—England. — *Bristol Channel. — Burnham Lights.* — The bearings of the red shade in the low lighthouse at Burnham have been altered from W. by N. to W. ¾ N., and the southern limit from W. ½ N. to W. ¼ N.

260.—England.—*West Coast.—Alteration of South Stack Low Light, North-West Point of Holyhead Island.*—According to previous notice the following alterations have been made in the South Stack Low (occasional) light. Its present position is 195 feet W. by S. of the main lighthouse, and its elevation above high water 90 feet instead of 40. Its period of revolution will be *one minute*, the

same as the main light, instead of 1 minute 30 seconds, and the arc of visibility will be from S. 4° W. round westward to N. 53° E. *Variation*, 21¼° *W*.

N.B.—The Low light will be exhibited in addition to the main light, but in thick or foggy weather only.

261.—BALTIC ENTRANCE.—*The Sound.*—*Sweden.*—(1) *Signal Station at Wiken.*—The following signals are given from a mast (46 feet high) with yard attached:—1. A ball on the northern yard arm indicates that the light-vessels in Flint channel are withdrawn. 2. A ball on the southern yard arm indicates that Drogden light-vessel is withdrawn. 3. A ball on the mast above the yard indicates that Falsterbo light-vessel is withdrawn. 4. A ball on the mast below the yard indicates that Malmö harbour is closed by ice.

(2) *Hveen Island Light.*—*Intended Temporary Alteration in Character.*—In consequence of defective machinery, it is intended in July, 1880, to make the following temporary alteration in the character of the light shown from the north-west point of Hveen island, the Sound:—The flashing light will be discontinued, and in place thereof a *revolving* light will be exhibited, until the repairs are effected. This light will be of less intensity and at longer intervals than the flashing light.

262.—BALTIC.—*Sweden.*— *Oland Island.*—*Shoals Eastward of Oland Point.*—There are two shoals, composed of sand and stones, lying about 33 miles eastward of Oland point, south extreme of Oland island:—1. Shoal ground with a depth of 7 fathoms over, and 9 to 10 fathoms around, in lat. 56° 11′ 50″ N., long. 17° 21′ 0″ E. 2. A shoal with a depth of 29 feet over it, and 8 to 9 fathoms around, in lat. 56° 12′ 55″ N., long. 17° 24′ 50″ E.

263.—PORTUGAL.—*West Coast.*—*Light on Cape Sines.*—With reference to previous notice this light is *fixed white*, visible through an arc of 270° (from the bearing of S.W. ⅝ S. round to N.W. ⅝ W.); elevated 130 feet above high water, and visible from a distance of about 19 miles. The lighthouse, 75 feet high, is three-storeyed—the upper portion is cylindrical in shape. Position, lat. 37° 57′ 30″ N., long. 8° 50′ 40″ W. *Variation*, 19¼° *W*.

264.—PORTUGAL.—*South Coast.*—*Guadiana River Entrance.*—

Medo-alto Light.—In consequence of alteration in the channel of Guadiana river bar, Medo-Alto light (on the west bank of the river) which formerly served as a mark for clearing the East point of the Bril, is no longer available as a leading light for entering the river, and can only be used, after the bar has been entered, to indicate the course to the anchorage. Position, lat. 37° 11′ 25″ N., long. 7° 22′ 35″ W.

265.—MEDITERRANEAN. — *France.* — *Time Ball at Toulon.*—Established at the Observatory, situated in the north-west part of the town of Toulon. The time ball is dropped twice daily, except on Sundays, as follows:—It is hoisted at 10^h 50^m a.m., and dropped at 11^h 0^m 0^s mean time at Toulon—equivalent to 10^h 36^m 18^s 6 Greenwich mean time. The signal is repeated at 11^h 2^m 0^s mean time at Toulon, which corresponds to 10^h 38^m 18^s 6 Greenwich mean time. Longitude of time signal, 0^h 23^m 41^s 4 East of Greenwich.

266.—MEDITERRANEAN.—*France.*—*Nice.*—*Alterations in Harbour Lights.*—The fixed white light, varied by red flashes every half minute, is now exhibited from the extremity of the outer mole, 109 yards south-eastward of its former position; elevated 47 feet above the ground, and 74 feet above high water. Position, lat. 43° 41′ 30″ N., long. 7° 17′ 0″ E. In consequence of this altered position of the fixed and flashing light on the outer mole, the two *provisional* leading *lights* (green and red) previously shown eastward of the port of Nice, are *discontinued.*

267.—MEDITERRANEAN.—*Adriatic.*—*Veglia Island.*—*Morlacca Channel.*—*Harbour Light at Verbenico.*—Exhibited from an iron support on the mole head at port Verbenico, east coast of Veglia island. It is an ordinary *white* light, elevated 13 feet above the ground, and 18 feet above the sea. Position, lat. 45° 4′ 40″ N., long. 14° 40′ 40″ E.

268.—MEDITERRANEAN.—*Greece.*—*Poros Island.*—*Poros Harbour.*—*Light at Northern Entrance Temporarily Discontinued.*—Notice will be given of the re-exhibition of this light.

269.—NORTH ATLANTIC.—*Canary Islands.*—*Tenerife.*—*Santa* [illegible].—*Re-exhibition of Mole Head Light.*—With reference to [illegible]ice respecting the temporary discontinuance of the fixed red

light on the mole head at Santa Cruz, further information has been received that on 19th April, 1880, the light was re-exhibited.

270. — EASTERN ARCHIPELAGO. — *Java.* — *Batavia.* — *Second Harbour Light on Mole.*—Exhibited from the extremity of the western mole. It is a *fixed white* light. Position, lat. 6° 6′ 0″ S., long. 106° 47′ 50″ E.

271.— EASTERN ARCHIPELAGO.— *Java.* — *North-East Coast.*— *Madura Strait.*—*Harbour Light at Bezukie.*—Exhibited westward of and near the river entrance at that place. It is a *fixed white* light visible from a distance of 8 miles; shown from an iron support, which with an iron watch-house, stands on a stone pedestal. The keeper's dwelling, constructed of stone, is situated farther inland. Position, lat. 7° 43′ 40″ S., long. 113° 39′ 40″ E.

272.—SOUTH AUSTRALIA.—*Shoals in Spencer Gulf.*—Information relative to shoals in the upper part of Spencer gulf, in the fairway of approach to ports Pirie and Augusta :—

1. A shoal, reported by the master of the ship *Blengfell*, is stated to have 5 fathoms over it, and to be situated (by good observations) in lat. 33° 26′ S., with Mount Young bearing N. by W. ¾ W. (distant 20½ miles), or in long. 137° 36′ 10″ E.

2. The Government of South Australia has given notice, dated 17th April, 1880, that a large *cheese-shaped* buoy, surmounted by pyramidal frame and lattice work, with globe on top, has been placed on a shoal (reported in 1879), 10 miles northward of the above shoal. The buoy, painted red and black in stripes, is moored in 4 fathoms at low water spring tides, and as reported, is approximately in lat. 33° 16′ S., long. 137° 36′ 30″ E. *Variation*, 4¾° *E.*

273.—SOUTH AUSTRALIA.—*Semaphore Anchorage, Port Adelaide, Gulf of St. Vincent.*—On and after the night of the 1st August, 1880, a *fixed red* light would be exhibited from the tower of the hulk *Fitzjames*, instead of the present fixed white light.

274.—SOUTH AUSTRALIA.—*Entrance to Port Adelaide.*—In consequence of the Looking-Glass beacon marking the entrance to Port Adelaide (on the north bank) having been run into and destroyed, it is notified, that until further notice, the position will be marked by a *cheese-shaped* buoy, painted *black*, and surmounted by conical framework and ball.

275.—New Zealand.—*Middle Island.—Cook Strait—Sunken Rock Westward of Cape Koamoroo.*—It lies about a quarter of a mile from the extremity of the reef on the western side of cape Koamoroo, south side of entrance to Queen Charlotte sound. This danger (*Stella rock*), on which the steam-vessel *Stella* struck, is nearly a cable in extent north and south, with a least depth of one fathom at low-water spring tides, and from 10 to 13 fathoms around; it lies with the following bearings, viz.:—White rocks, N.W. ½ W.; Cape Koamoroo, E. by N. ¼ N.

Note.—The south extreme of Long island just open of the Westernmost Twin, leads 1¼ cable north-westward of Stella rock. *Variation,* 15¼° *E.*

276.—New Zealand.—*Middle Island.—West Coast.—Okarito Lagoon.—Discontinuance of Harbour Light.*—This light previously shown from the flagstaff at Okarito, west coast of Middle island, is discontinued.

277.—North America.—*Vancouver Island.*—The following information has been recently published:—

(1) *Esquimalt Harbour.—Thetis Cottage,* one of the objects forming the leading mark for entering this harbour, has been demolished during recent heavy falls of snow, and nothing is left standing on the site but the chimney, which can only be distinguished with difficulty.

(2) *Kyuquot Sound.—Clan-ninick Harbour.*—A sunken rock, on which the Hudson Bay Company's steam-vessel *Princess Louise*, drawing 9 feet, recently struck at low-water spring tides, is reported to lie nearly midway in the entrance of this harbour, at the distance of 2 cables north of chief rock.

278.—United States.—*Pacific Coast.—California.—Development of a Dangerous Patch of Foul Ground off the Entrance of Timber Gulch, 2½ miles E.S.E. of Fort Ross.*—The patch lies from one-half to three-quarters of a mile from the shore, and contains several rocky heads—one nearly awash at low water, others with from 8 to 15 feet water, with 4 to 6 fathoms between them, and 9 fathoms close at hand, outside. At the time of the survey, October, 1879, *kelp*, extending out from the shore, covered the westernmost half of the patch. It is not often these rocks are

marked by breakers, their area being small. The U.S. surveying steamer *Hassler* was near striking upon the shoalest spot found, without having been warned either by the lead or by the appearance of the water. Thirty fathoms of water are occasionally found in this vicinity within a half mile of the rocks, and it is dangerous for vessels, coasting, to pass inside that depth.

279.—South America.—*West Coast.—Peru.—Iquique Road.—Light on Iquique Island.*—It is a *fixed and flashing white* light, showing flashes *every thirty seconds*, visible through an arc of 180°; elevated 96 feet above high water, and should be seen from a distance of 20 miles. The lighthouse, 72 feet high, is constructed of iron, and consists of a cylindrical column (upper portion the widest) secured by four iron stays; the structure is painted white and is situated near the centre of Iquique island. The keeper's dwelling, constructed of wood, and one-storeyed, stands 27 yards north-west of the lighthouse. Position, lat. 20° 12′ 30″ S., long. 70° 11′ 20″ W.

280.—South America.—*West Coast.—Chile.—Harbour Light at Antofagasta.*—Exhibited from the small tower of the harbour buildings at Antofagasta. It is a *fixed red* light, visible through an arc of 90° or between the bearings of E.N.E. and S.S.E.; elevated 22 feet above the ground and 30 feet above high water, and should be seen from a distance of 3 miles. Position, approximate, lat. 23° 39′ S., long. 70° 25′ W.

Note.—This light marks the fairway of the roadstead, and the landing place for boats. It is usually shown from sunset to midnight, but when steam-vessels are expected, until sunrise. It is intended to improve or change this light. *Variation*, 11¾° *E.*

281.—West Indies.—*Trinidad.*—(1.) *Position of Darien Rock.*—Information relative to the position and description of Darien rock, lying about 25 miles eastward of Trinidad:—On approaching Darien rock from the north-west, the day clear and fine, broken water was observed from H.M. gun vessel *Griffon's* top at the distance of 6 miles; the vessel was subsequently anchored in 13½ fathoms coral, with the rock bearing N.E., distant 4 cables. From the *Griffon* at anchor the following bearings were observed:—Hill over Galera point (830 feet), N. 52½° W.; L'Ebranche

hill, S. 85° W.; Trinity hill (1,070 feet), S. 49½° W. These bearings place Manzanilla point on a West (*true*) bearing, distant 23¾ miles. An examination of the locality gave the undermentioned particulars:—The rock was found to be nearly flat, to uncover between the breaking seas, and to extend in a N.N.E. direction about 40 yards, with a breadth of 25 yards. At the distance of about 20 yards around the rock, the least water found by the boats was 4 fathoms sand, deepening to 10 fathoms at about 4 cables; and at the distance from half to one mile around, depths of from 15 to 24 fathoms over sand and coral were obtained from the ship. Position, lat. 10° 31′ 35″ N., long. 60° 35′ 45″ E. During the stay of a day and a-half made by the *Griffon*, there was a confused sea for a quarter of a mile round the rock, and a remarkable rip extended for about 1½ miles to the N.N.E., giving the vicinity the appearance of shoal water. The current was observed to set N.N.W. 1·8 mile per hour.

(2) *Position of Delaware Bank.*—Information resulting from a search made by H.M.S. *Griffon* between 31st March, and 5th April, 1880, over and near the position heretofore received for Delaware bank, lying eastward of Galera point, Trinidad:—At the assumed position (lat. 10° 42′ N., long. 60° 5′ W.), bottom was not reached at 100 fathoms, and soundings in the vicinity gave no indication of shoal water—north-west of that position however, at the distance of about 19 miles, the vessel was anchored for two nights on a bank composed of sand and coral, about 1¼ mile in extent, on which the least depth found was 13 fathoms with from 17 to 40 fathoms around, and lying with Galera point bearing west distant 32 miles. Position, lat. 10° 50′ 20″ N., long. 60° 20′ 50″ W.

Note.—Soundings of from 40 to 50 fathoms were obtained in S.S.E. direction from the foregoing position at the distance of about 10 miles. *Variation*, 1¼° *E.*

282.—WEST INDIES.—*Haïti.—Port-au-Prince.—Light on Arcadins.*—Exhibited from a lighthouse recently erected on southern of the Arcadins islets, north shore Port-au-Prince. is a *fixed white* light, elevated 36 feet above high water, visible from a distance of 9 miles. The lighthouse, 31 feet h

is constructed of iron, circular in shape, and painted white. Position, approximate, lat. 18° 47′ 30″ N., long. 72° 38′ 20″ W.

Light at Lemantin Point.—Exhibited from a lighthouse at Lemantin point, south shore Port-au-Prince. It is a *fixed red* light, varied by *red* flashes *every thirty seconds*, elevated 97 feet above high water, and visible from a distance of 15 miles. The lighthouse, 93 feet high, constructed of iron and supported by four buttresses, is circular in shape and painted white; it is situated 130 yards westward of the position of the old lighthouse now demolished. Position, approximate, lat. 18° 33′ 20″ N., long. 72° 24′ 50″ W.

Both lights were to be shown on 1st July, 1880.

283.—CENTRAL AMERICA.—*San Salvador.*—*Shoal Ground off Port Jiquilisco.*—Near the mouth of San Miguel river. The centre of this shoal ground (*Lempa shoal*) forms a bar off the mouth of Jiquilisco or Triumfo Bay. It extends in the form of a horse-shoe across the mouth of the bay, from side to side, and its outer edge or bend is about 4 miles from the beach. At high water in calm weather, or with light breezes, the bar is perfectly smooth, but at other times the sea breaks heavily all over the shoal. The following bearings were taken from the U.S.S. *Tuscarora* just outside the breakers:—San Miguel Volcano, N. 26° E.; San Vicente Volcano, N. 43° W.; San Salvador Volcano, N. 55° W. The centre of the shoal may be considered, approximately, in lat. 13° 7′ N., long. 88° 25½′ W.

Note.—Mariners are cautioned not to approach the shore within a distance of 6 miles, when navigating in the vicinity of Lempa shoal. *Variation*, 7¼° *E.*

284.—UNITED STATES.—*Virginia.*—*Automatic Signal Buoy off Cape Charles.*—*Approach to Chesapeake Bay.*—The buoy, painted red with the letters C.C. in white, and giving blasts of a whistle at short intervals, is moored 6½ miles south-east of cape Charles lighthouse in about 6 fathoms water.

285.—UNITED STATES.—*Massachusetts.*—*Light at Stage Harbour, on Harding's Beach.*—It is a *fixed white* light, lighting 270° of the horizon. The light-tower is painted red; the lantern black. The focal plane is 85 feet above the ground, and 45 feet

above mean low water. The keeper's dwelling is painted white, and stands 50 feet south of the tower. Approximate position, lat. 41° 39′ 20″ N., long. 69° 59′ W.

Charts, &c., Published by the Hydrographic Department, Admiralty, in May and June, 1880.

No.		s.	d.
647	South America, west coast:—Coronel, Lota, and Colcura bays	1	6
998	Siam gulf:—Pulo Kapas to Lacon roads. (Plans, Singora roads. Patani roads. Great Redang harbour. Tringano)	2	6
1363	Africa, west coast:—Sherbro island to cape Mesurado. (Plans, Gallinas river. Cape Mount river)	2	0
2828	Newfoundland:—Duck island to Ship rock shoal, including port Basque	1	6
1612	Adriatic sea:—Ports and anchorages in Dalmatia—Ports, Trau; Spalato; Makarska; S. Giorgio; Verboska and Gelsa. Almissa road. Spalmadori channel. Citta Vecchia bay	1	6
15	South America, west coast, Patagonia:—Molyneaux sound. Portland bay		0
36	England, Bristol channel; Lundy Island.		
475	Australia:—North-west coast of Australia between the parallels of 10° 8′ and 21° S. with the off-lying islands and reefs.		
241	Plans added, Tolmeitah. Marsa Sousah.		
2600	Plan added, Aves island (Bird I.)		

Charts that have received Important Corrections.

2608	France, south coast:—Hyères to Rade d'Agay.
214	Pacific ocean:—Solomon islands.
298	Newfoundland:—St. John's harbour.
1951	England, west coast:—Liverpool bay.

No.

2666 North America, east coast:—St. John's (Newfoundland) to Halifax (Nova Scotia).

2458 England, Thames river:—Gravesend to the Nore.

2660b China sea, southern portion.

2082 Africa, south coast:—Table bay to cape Agulhas.

88 Spain, north coast:—Port San Sebastian.

2050 England, south coast:—Spithead and approach from the eastward.

347 Australia, east coast:—Percy isles to Whitsunday island.

2400 China, east coast:—Min river.

2120 New Guinea, south coast:—Aird river to Freshwater bay.

1639 Gulf of Mexico:—Mississippi river to Boquillas Cerrados.

483b West Indies:—Trinidad island and Paria gulf.

1801 South America, east coast:—Trinidad island to Surinam.

2305 Norway, sheet 8:—Stav fiord to Romdals islands.

241 Mediterranean:—Ben Ghazi to Dernah.

2690 France, west coast:—Brest roadstead.

1302 South America, west coast:—Ports Caldera and Yngles, &c.

2148 North America, west coast:—Fonseca gulf to Sonsonate road.

1571 Spain, east coast:—Port Alfaques.

Hydrographic Notices recently Published by the Hydrographic Office, Admiralty, 1880.

13.—Vancouver Island Pilot, Notice 6; Information relating to Esquimalt harbour and to Kyuquot sound.

14.—Australia Directory, Vol. II., Notice 1; Information relating to portions of the east coast from Moreton bay to Torres strait.

OUR OFFICIAL LOG.

Official Inquiries at Home, 1880.

640. *Elsie*, s.s.; built at Sunderland, 1877; owned by Mr. F. Gordon; tonnage, 1,182; the Tyne to Hamburg; coals; supposed to have been lost at sea. Inquiry held at Sunderland, June 2, 1880, before Booth and Wilson, J.P.; White and Parfitt, N.A. Court found that there was no evidence to show from what cause the vessel foundered, but considered that her freeboard of 2 feet 2 inches was not sufficient.

641. *North Carolina*, barque; built at Dumbarton, 1876; owned by Mr. H. Barber and others; tonnage, 553; Birkenhead to Bermuda; coals; thence to Baltimore, during which passage she was stranded and severely damaged, but after repairs sailed for Liverpool with a general cargo; having sprung a leak she put into Bermuda, was repaired, and left again for England, but again put back, and in making for the harbour struck on a reef and became a total wreck. Inquiry held at Liverpool, June 4, 1880, before Raffles, Judge; Wilson and French, N.A. Loss occasioned by the careless navigation of the master. Certificate suspended for six months.

643. *Souvenir*, barque; built in Austria, 1855; owned by Robert Fell and others, of Newcastle; tonnage, 606; Pensacola to Tyne; timber; stranded on the Kentish Knock Sand, May 14, 1880. Inquiry held at Greenwich, June 4, 1880, before Balguy, Stip. Mag.; Hight and Foster, N.A. Chief mate in default for removing the look-out man and replacing him, and also for neglecting the master's instructions. Certificate as master suspended for three months.

647. *Douglas*, barque; built in Prince Edward Island, 1867; owned by Mr. J. Wood; tonnage, 311; Santos to New York; old iron; lost on Peek's Beach, New Jersey, April 4, 1880. Inquiry held at Liverpool, June 9, 1880, before Raffles, Stip. Mag.; Wilson and French, N.A. Loss occasioned by negligent navigation on the part of the master. Certificate suspended for three months.

648. *Galeed*, s.s.; built at Sunderland, 1870; owned by J. F. ddleton and others; tonnage, 604; Gothenburg to London; n; supposed to have foundered at sea. Inquiry held at North

Shields, June 14, 1880, before Hedley and Wait, Justices; Aplin and Comyn, N.A. No evidence adduced to show cause of loss. The cargo was not properly stowed.

649. *Chimborazo*, s.s.; built at Fairfield, Govan, 1871; owned by Mr. J. Anderson and others; tonnage, 2,443; London to Australia; general cargo; coals, and passengers; suffered considerable damage from the steam launch breaking adrift whereby loss of life ensued, February 9, 1880. Inquiry held at Greenwich, June 18, 1880, before Balguy, Stip. Mag.; Forster, Pickard, and Harland, N.A. Casualty due to perils of the sea. Vessel navigated in a proper and seamanlike manner.

650. *Beignon*, s.s.; built at Jarrow-on-Tyne, 1879; owned by the Beignon Steamship Co., Limited; tonnage, 754; Bilbao to Cardiff; iron ore; stranded and lost on Vielle Point, Raz de Sein, Finisterre, May 20, 1880. Inquiry held at Cardiff, June 9, 1880, before Jones, Judge; Curling and Ward, N.A. Casualty due to unskilful navigation on the part of the master in steering an improper course, and in endeavouring to pass a dangerous rock at full speed. Certificate suspended for three months.

653. *Conovium*, schooner; built at Aberystwith, 1876; owned by Mr. W. Jones; Grays to Dublin; cement; lost on the rocks off the Lizard, May 4, 1880. Inquiry held at Greenwich, June 25, 1880, before Balguy, Judge; Powell and Parfitt, N.A. Master in default, and was censured as he held no certificate.

Official Inquiries Abroad.

639. *Sophia R. Luhrs*, barque; stranded on a rock near Lyall's Bay, New Zealand, February 27, 1880. Inquiry held at Wellington, March 9, 1880. Master acted imprudently, but rock not being defined on chart he was exonerated from blame.

642. *Philia*, brig; lost at Mossel Bay, January 11, 1880. Inquiry held at Mossel Bay, January 16, 1880. Disaster attributable to a violent gale of wind.

644. *Rocket*, s.s.; suffered damage from burning of boiler. Inquiry held at Sydney, April 5, 1880. Accident due to the gross neglect of engineer in charge in allowing the water in the boiler to get low. Certificate suspended for six months.

645. *Floral Star;* lost on Shan-tung promontory. Inquiry held at Chefoo. Casualty due to a strong north-westerly current occasionally experienced in this part of the world.

646. *Nambuccra,* schooner; lost on the Bar, Brunswick River. Inquiry held at Sydney, April 5, 1880. Loss caused by failing of the wind at a critical time.

651. *Aldergrove,* ship; stranded off Point Malcolm, May 3, 1880. Inquiry held by the Marine Board of South Australia. Accident due to the pilot not having boarded the vessel sooner. Certificate suspended for one month.

652. *Cassiope,* ship; and *M. & E. Cox,* ship; in collision at Sea, February 21, 1880. Inquiry held at Moulmein, May 1, 1880. Master of *M. & E. Cox* to blame for omitting to starboard his helm and go under the stern of the other vessel, but in consideration of excellent character Court merely reprimanded him.

Suez Canal.—Owners of vessels navigating the Suez Canal are informed that, in order to prevent the difficulties which may arise in consequence of the Special Suez Canal Tonnage Certificate not being on board at the time of a vessel's passage through the Canal, the Suez Canal Company will be prepared in future to accept the deposit of the certificate (or of a duplicate certified in regular form by the Board of Trade) by any master who is willing to place it under the charge of the company at Port Said. A copy of the certificate will in that case be sent by the company to Suez; and the documents will then always be at hand to enable their officers to make the necessary verification. In the case of alterations, requiring the issue of a fresh certificate by the Board of Trade, owners and masters should be careful to have the new certificate deposited in place of the old one. In order to facilitate matters, the Board of Trade are prepared to grant to the owners of the ship at any time, a properly certified copy of any Suez Canal certificate they have issued, on application being made to the Board of Trade by letter. The fee of five shillings is payable at the Mercantile Marine Office on delivery of the duplicate certificate to the applicant.

THE

NAUTICAL MAGAZINE

FORTY-NINTH YEAR.

VOLUME XLIX.—No. IX.

SEPTEMBER, 1880.

THE LAW OF STORMS, AND THE HEAVING-TO TACK.

THE practical bearing of the Law of Storms has been so often explained, that to speak further concerning it may seem like an attempt to paint the lily or to perfume the violet. It ought to be so, but I do not think it is; for I constantly meet men of considerable experience as navigators who do not familiarly know, and even find it difficult to understand, how the wind shifts in a storm—in a cyclone. We have perhaps happily got rid of that once large class, who neither knew nor cared to know anything at all about it, and claimed the right to decide on what to do in any emergency—"As plain sailors, thank God, without any d——d tomfoolery:" but there are still many who have that little learning which is proverbially dangerous, and who will tell you—"Everybody knows that the shift in a storm is against the sun in the northern hemisphere, and with the sun in the southern hemisphere;" which is by no means true: or others again with a further pennyworth of "science" who will argue that "according to Dove's Law of Gyration, the wind always shifts with the course of the sun, astronomically speaking, in both the northern and southern hemispheres;" which also is very far from being fact. Now the subject is one of such

extreme and literally vital importance to the sailor, that even at the risk of wearying those who have already grasped the full meaning of the laws, I propose to devote a few pages to further expounding them.

The elementary meteorological law of cyclones, then, is that the wind blows, against the course of the sun (astronomically speaking), round a centre of low pressure. That is to say, and leaving the "astronomically" out of the question, the rotation is against the hands of a watch in the northern hemisphere, and with the hands of a watch in the southern hemisphere: or again, as the law of Dr. Buys Ballot has it—If you stand with your back to the wind, you have a low pressure, on your left-hand, in the northern hemisphere; on your right-hand, in the southern hemisphere. This, with certain modifications which I shall speak of presently, is the result of observation. The law is so, because it is. The reason of it may be argued about; it is certainly not known positively: but about the fact there is no doubt whatever; and it is with matters of fact alone that I am now concerned. We accept, then, this elementary law as a known observed fact, as true as the South Foreland Lights, or the Goodwin Sands. But—and this is the point on which I now have to insist—the rotation of the storm is not the shifting of the wind, nor is it, *by itself*, the cause of the shifting of the wind. If the wind merely blew round and round the storm-centre, it might continue to do so till doom's-day, without producing any shift at any named place. According to the relative position of the centre, the wind at that place would have a certain definite direction, and would have it, as long as the storm lasted and the centre remained fixed.

An illustration on a small scale may perhaps make this clearer. Suppose the travelled ant, which we used to read about in our young days, to be walking up a wall, and to come near the rim of the fly-wheel of a steam-engine. This fly-wheel has a diameter of, say, twelve feet; a circumference of some six and thirty. The limit of the ant's observation is, perhaps, two inches each way. The wheel is going round and round; but what is the ant's idea? Merely that a mass of iron is rushing past in one constant direction; he wonders where this enormous quantity of iron comes from;

he argues that it must soon come to an end and pass away; but he notices no variation in the direction of the rush: this is always the same, the line of the tangent at the point opposite which he is posted—a line, we may suppose, sloping downward from left to right, as at *a* (Fig. 1). But suppose that, whilst he is watching,

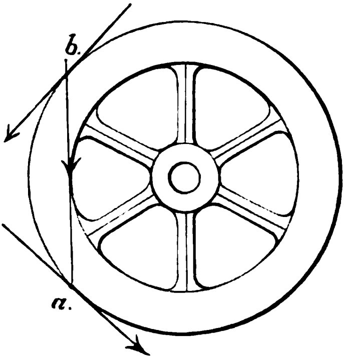


FIG. 1.

the axle of the wheel, and the wheel with it, begins slowly to descend; the direction of the motion, relatively to the ant, gets more and more upright, is straight down, and presently slopes the other way, from right to left; it is as if the ant had been slowly moved along the line *ab* to the position *b*. Here, then, as far as the ant is concerned, the change in the direction of the motion is due quite as much to the downward motion of the wheel as to its rotation, and to neither one nor the other singly.

So it is with a cyclone. If the cyclone's centre were to remain fixed, the direction of the wind at any place within its range would remain steady; but if the centre, and the whole cyclone with it, moves, then the wind at every place within its extent is subject to change of some sort. Now the centre does move; the whole cyclone has an onward motion in some direction, and this motion, as involving a change of place, is commonly known as "the motion of translation," in contradistinction to the other, the revolving round the centre, which is "the motion of rotation." The nature and character of the shift of wind at any place depend on each of these motions, on the one just as much as on the other; and they change, not according to the different hemispheres, northern or

southern, but according to the different sides of the cyclone, right or left. It is therefore of the highest importance to the seaman to determine which side of the cyclone he is on, that is to say, how he is situated with reference to the track of the cyclone's centre; and though this may to some extent be *guessed at*, by reference to the chart and the comparison of cyclone tracks marked on it, it can only be determined positively by careful observation of the wind and of the barometer.

Premising, then, that the sides of a cyclone are named in the same way as the banks of a river, right or left, as you look to the point towards which it is moving, it may easily be seen that if, in the northern hemisphere, a cyclone (Fig. 2) is travelling in the

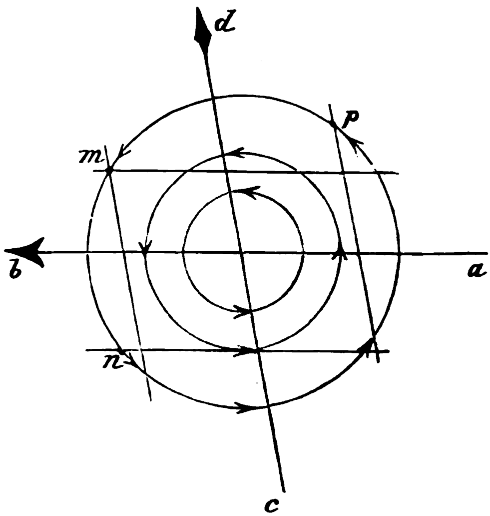


FIG. 2.

direction *ab*, the ship *m*, in the right side of the cyclone, has the wind at first from N.E., by-and-by from E., and afterwards from S.E.; the changes are towards the right: whilst the ship *n*, in the left side of the cyclone, has the wind first at N.W., then at W., and afterwards at S.W.; the changes are towards the left. Or again, if the cyclone is travelling in the direction *cd*, *m* is now on the left side, and her successive shifts of wind are N.E., North, N.W., that is, towards the left; and *p*, which is on the

right side, has the wind successively at S.E., South, S.W., shifting towards the right. Any other line of direction may be taken; the result will be found to be always the same: in the northern hemisphere the wind on the right side of a cyclone shifts towards the right, and on the left side it shifts towards the left. In the southern hemisphere the motion of rotation is reversed, but the rule for the shift of the wind remains the same. Suppose we have a southern cyclone (Fig. 3) moving in the direction *ab*;

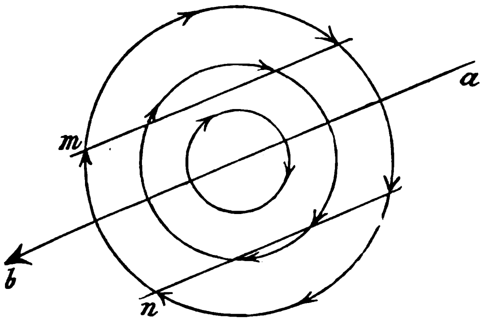


FIG. 3.

the wind for *m*, in the right side, changes from South, through S.W., and W., to N.W.; for *n*, in the left side, from S.E., through E., to N.E., or North; and similarly for any other directions that may be drawn. Hence we have the one general rule, irrespective of latitude, or longitude, or any geographical position: on the right side of a cyclone the wind shifts towards the right, and on the left towards the left.

Now it is not necessary to point out to seamen that if in a furious gale a ship is by the wind or hove-to, and the wind shifts some three or four points in a fierce squall, the safety of that ship depends a good deal on what tack she is on; and from what I have said, it will at once be seen that, in whatever part of the world she is, north latitudes or south, if she is on the right-hand side of the storm she ought to be on the starboard tack, if on the left-hand side she ought to be on the port tack. All this may be shortly stated so: on the right-hand side the wind shifts towards the right, and you should lie-to on the starboard tack; on the left-

hand side the wind shifts towards the left, and you should lie-to on the port tack. Or, still more shortly:—

Right; right; starboard.
Left; left; port.

Of course, what I have here said has nothing to do with the advisability of lying-to at all, or of sailing by the wind; that is another and totally different question. It will, for instance, be readily seen that for a ship in the foremost or leading half of a cyclone, there is, in lying to, the danger of drifting into the centre, and more especially so in the right-front quadrant in the northern hemisphere, or the left-front in the southern hemisphere, where the line of the cyclone's advance is to leeward, and any lee-way more than is expected may be fatal. And it must not be forgotten that, as has been proved by Mr. Meldrum, of Mauritius, the centre may possibly, if not probably, be very considerably in advance of its position as laid down by the established rule. About this there is no certainty. We may believe that every different cyclone has, in this, a character of its own; but it seems best always to take into account the possibility of the centre being far a-head of its estimated position. That, however, is beside my present subject, which is merely the shifting of the wind: and having laid down the rule as above, right, right; left, left; the question arises, how are we to tell what side the ship is on, right or left? The answer to this seems almost like wandering in a circle: we can only tell by carefully observing the shifts of the wind. That is to say, by observing the tendency to shift, we can tell what the violent and dangerous shifts will be; but if the direction of the wind does not shift, whilst the force of the wind increases, and the barometer continues to fall, then the ship is right in the storm's track, and the sooner she gets out of it the better. So, also, if the shifting of the wind is not very marked, the ship is dangerously near the track, and the first idea should be to get clear of it.

A notice of the observations actually made at Mauritius on the 20th and 21st of March, 1879, will help to illustrate my meaning.

A few minutes after sunset on the 19th, the upper cirrus clouds assumed at first a yellowish ash colour, which deepened into scarlet, and then changed into dark red. At one time the whole

sky looked as if it were on fire. This, together with the irregularity of the barometer was an indication of a coming storm. The barometer fell slowly during the night of the 19th and on the morning of the 20th. By 9 a.m. on the 20th it had fallen to 29·811 (its normal height at that hour being 30·084), and the wind, from S.E. by E., had a velocity of 30 miles an hour. At noon, bar. 29·713, falling at the rate of ·033 in. per hour; wind S.E. by E., 36 miles per hour, and increasing.

2 p.m. Bar. 29·605, falling at the rate of ·039 in. per hour; wind S.E. by E., 44 miles per hour.

4 p.m. Bar. 29·488, rate of fall ·055 in.; wind S.E. 56 miles.

6 p.m. Bar. 29·440, rate of fall ·034 in.; wind varying between E.S.E. and S.E., 60 miles.

8 p.m. Bar. 29·373, rate of fall ·050 in.; wind S.E. by E. ½ E., 30 miles.

Here, then, it will be seen that throughout the day the barometer continued to fall, and the wind, steady in direction, to increase in force. It seemed almost certain that the cyclone was advancing on a N.E. by N.—S.W. by S. line, as *ab*, (Fig. 4) straight

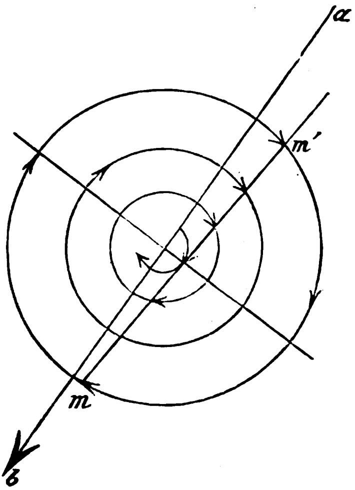


FIG. 4.

to Mauritius. By 9 p.m., however, there was a slight tendency in the wind to draw to the eastward, that is, to the left, and it was

hoped the storm would pass clear of the island to the north and north-west.

9 p.m. Bar. 29·324, rate of fall ·063 in.; mean direction of the wind E.S.E., veering towards the east, 66 miles.

10 p.m. Bar. 29·282, rate of fall ·049 in.; mean direction of the wind E.S.E. ½ E., veering towards E., 65 miles.

The lowest barometer was 29·037, at 2 a.m. on the 21st, with the wind at E. ¼ S. Immediately the wind passed to the north of E. the barometer began to rise. The greatest mean hourly velocity of the wind was 80·5 miles, from E.N.E., about 6 a.m., greater in the squalls.* In this case it would appear that the cyclone, having travelled for twelve or fourteen hours straight on end for Mauritius, swerved at the very last and passed a little to the north and north-west, the line *mm′* denoting the trace of the island across the circle of the storm, which went on to Réunion, where it did a good deal of damage.

When a ship is lost in the open sea, there, in nine cases out of ten, is an end of her; we know nothing more than that she does not come into port. But why? by what accident, by what mistake of the builder or the navigator?—that remains a secret. It is well, therefore, to enquire into this mysterious *why* when opportunity permits; and one case that occurs to me is the very wholesale destruction of merchant ships and men-of-war that occurred in the September of the year 1782. It is a long time to go back; but the loss was on a scale almost unparalleled in modern history, and is one of which we have sufficiently accurate accounts.

In the summer of 1782, a large convoy sailed from Jamaica under the escort of nine ships of the line and some frigates: on the 17th September, in or about lat. 42° long. 47°, they got into a hurricane, and a great many never came out of it. Of the merchant ships, I have not been able to get any satisfactory account; but of the nine line-of-battle ships, two only got to England, and those with difficulty. Four sunk in the open sea;

* I have taken these observations from Mr. Meldrum's official report, as communicated to the Meteorological Society by the Secretary of State for the Colonies.

another also sunk, but earlier, and under different circumstances; one got back to Jamaica; and one, in a very shattered condition, got to Halifax. Now, one of those that foundered in mid-Atlantic was the *Ramillies* of 74 guns, bearing the flag of Rear-Admiral —afterwards Lord Graves; and perhaps on this account her loss was more fully inquired into. It was officially reported that on the evening of the 16th September, the wind being strong from the S.E., with a very heavy sea, she brought-to under the mainsail, on the starboard-tack. "Between three and four on the morning of the 17th. the wind flew about to the N.N.W., and, without a lull, took us by the lee, blowing a most violent hurricane; the main-mast went by the board, the mizen-mast half way up, the fore-topmast over the starboard-bow, the fore-yard broke in the slings, the rudder almost tore off from the stern-post, the tiller snapped in two." With great difficulty she was kept afloat for four days, and was then abandoned, set fire to, and blown up. Of the other three, little is known; very few survived to give an account of the catastrophe; but they, as the whole squadron, were lying-to on the starboard-tack. I have been able to examine the log of the *Canada*, also a 74-gun ship, which, with better fortune, reached England; the one is sufficient for all, and shows us that lying-to on the starboard-tack was the one thing which they ought *not* to have done. Here are some extracts. "At midnight of the 16th September, light airs and variable; at 5 a.m., course N.N.E., 2 knots, wind E.S.E.; and so till noon, in lat. 42° 21′ N., long. 47° 26′ west of London." After which we have, for the 17th September—

H.	K.	F.	Course.	Wind.	Remarks.
1	5	3	N.E.	E.S.E.	Fresh gales and cloudy; handed mizen-top-gallant sail. Close reefed fore and main top-sails.
2	3	6	N.E. by E.	S.E. by E.	
3	3	4			
4	3	6			
5	2	6	N.E. ½ E.		Do. weather; struck top-gallant masts and quoined the lower deck guns.
6	3	2			At 6, carried away lee main topsail sheet, up mainsail and furled it, set main staysail. Fresh gales with rain.
7	2	6			
8	2		N.E. by N.		

H.	K.	F.	Course.	Wind.	Remarks.
9			Up N.E.		At 9, battened down the gratings;
10			Off N.		at 9½, fore-tack broke, hauled up
11					the foresail and furled it.
12					(Midnight.) Strong gales.
1			Up N.E.		
2			N.E. by E.		
3			Up N. by E.	N.W.	At 3 a.m., taken aback by a strong gale from the N.W., which carried away the main topmast and mizen-mast. Employed clearing the wreck. Observed the *Glorieux* with her foremast, bowsprit, and main topmast gone. Saw the Admiral with his main and mizen-mast gone, and fore-topmast.
4			Off N.N.W.		

From all which it is evident that the *Canada* was nearly in the line of the storm's track, travelling from S.W. by S. to N.E. by N., but was rather on the left-hand side of it, as is shown by the way in which the ship continually broke off: up N.E., off N., at 9 p.m.; up N. by E., off N.N.W., between 2 and 3 a.m. Lying-to, as she was, when the wind shifted, she was fortunate in not sustaining much heavier damage than she did.

I have been led to this renewed consideration of the law of the heaving-to tack by the meteorological circumstances accompanying the loss of the *Atalanta*. As yet, at least, it is quite impossible to say how or why the *Atalanta* has disappeared; but all the evidence now before us tends to show that capsizing was the thing most unlikely to happen. The power of recovery of all Symondites is enormous. But, on the other hand, it is admitted that ships of this build are exceptionally dangerous if they are forced into sternway. It appears, from the very painstaking enquiry of Mr. Charles Harding,* that, on the 12th of February, a cyclone raged over that part of the Atlantic where the squadron I have just spoken of perished in 1782, and where, if nothing untoward had previously happened to her, the *Atalanta* must have been on that date. If we suppose that her masts were securely stayed, and that she was taken

* Published for the Meteorological Society, by Stanford.

a-back in some such way as the *Canada* was, as the *Ramillies* and the ships that went down with her were, then it is not improbable that she too went down, but more suddenly, driven under, stern first. I do not, of course, pretend to say that this was so; but amongst other conjectures as to her fate, this one is, at least, plausible. I assume that she did not capsize. She had been thoroughly overhauled; it is, therefore, not likely that she started a plank. Did she run foul of an iceberg? We don't know. Did she catch fire? Some wreck would surely have been found. Did she heave-to on the wrong tack? What we know has happened in by-gone days, may have happened once again, as fatally as ever.

J. K. LAUGHTON.

FRENCH SHIPPING BOUNTIES.

THERE can be no doubt that the proposition to grant certain bounties in aid of French shipping threatens a serious interference with the business of some portions of the British shipping community. Many circumstances have contributed to bring about the state of things which causes so much jealousy on the part of other nations, and stimulates them to adopt protective measures, viz., that the over-sea carrying trade of the world is chiefly conducted by British ships and British shipowners. What these circumstances are it will be well for the French nation now to enquire, but they may be assured at the outset that the present maritime and commercial success of Great Britain is not the result of a bounty-fed industry, nor of a commerce fostered by protective tariffs.

It more immediately concerns ourselves to enquire as to the probable effect which the proposed action of the French Government may have on our shipping trade.

Briefly stated, the propositions of the French Mercantile Marine Bill (the text of which we published in our August number) are to give tonnage allowances to shipbuilders for building ships in France,

and a navigation bounty to shipowners for every 1,000 miles traversed by French foreign-going ships, with an increase of 15 per cent. if such ships are French built steamers. The practical effect of the propositions may be stated as follows :—

Under Article 4 : For an iron steamer of about 4,000 tons gross register, built in France, the shipbuilders would get 240,000 francs, about £9,600, on the hull, besides 12 francs per 100 kilos. on the weight of the machinery, say about 420 tons, or about £2,200.

Under Article 9 : A new steamer of 4,000 tons gross, 2,600 nett, going on a voyage to South America and back, say about 6,200 miles out and about 6,200 miles home = 12,400 miles—would receive 1·50 franc per ton, nett register, per 1,000 miles = 12,400 at 1·50 per 100 = 18 francs, 60 × 2,600 = £1,934, and as she could make four such voyages in the year, this would be equal to a bounty of nearly £8,000 per annum.

It will be seen from the foregoing that with such aid as is indicated, we shall be heavily handicapped in competing with French shipyards, or in any foreign carrying trade into which French ships may enter. The Shipowners' Association of Glasgow have already memorialised the Government to take steps for preventing the Bill from passing into law, and have pictured a dismal prospect for British trade and shipping, if the impending catastrophe is not averted. Agitation in other quarters is also on foot. The memorialists say in reference to the granting of a bounty to French shipbuilders, ostensibly for the purpose of compensating them for the Custom House tariff charges, but in effect to encourage the extension of the shipbuilding industry in France, that they have reason to believe overtures have already been made to British shipbuilders to establish themselves in that country. They estimate that this bounty would be equal to about 15 per cent. of the value of the larger class of iron steamers, and assert that the diversion of the shipbuilding trade of this country to France would be a national calamity, the consequences whereof cannot be over-estimated.

As regards the navigation bounty they estimate that it will yield ...ally about 12 per cent. of the value of the foreign-going ships ...ed in France, and built elsewhere, and about 14 per cent. for

approved vessels built in France, and state that should the said Bill become law it will be in the highest degree prejudicial to British shipping, and to the British nation. The effect of it will be to drive British ships out of the French over-sea carrying trade as soon as vessels can be built in France to do the whole of the carrying; and if, as it is expected, British-built ships may become French property, and receive the running bounties, a vast fleet of British ships will speedily be transferred to the French flag, and much of the British carrying trade itself will be carried off by these vessels. Further, as it is necessary that these vessels shall have French captains and the major part of their crew French, and as these ships are liable to be requisitioned for war purposes by the French Government, the ultimate result will be that a smaller number of British masters and seamen will be required, while at the same time the French Navy and the number of their seamen will be greatly increased.

They urge therefore that immediate steps be taken by the Government of this country to prevent, if possible, the Bill passing into law, by making such friendly representations to the French Government, or otherwise, as may have this effect; and that it must not be overlooked if this law be once passed it cannot be altered for 10 years. That there is no doubt that the proposed measure is an indirect attack on the principle of equality of flag recognised by France in her Commercial Treaties with other nations, and if persisted in, it will be, it is submitted, an insuperable difficulty to the conclusion of her Treaty of Commerce with this country.

We, as a maritime and commercial nation, probably have reason to complain of the course of action proposed to be taken by a neighbour with whom we are supposed to have the most friendly relations. It looks like a cut into our own trade, an attempt to oust us from our position as shipping carriers which has been the growth of years, even centuries, and any influence which our Government may have with the Government of France may well be used in the endeavour to prevent the Bill becoming law.

We sincerely sympathise with those owners whose special trade is seriously threatened by this project of law. Our enterprising

shipowners and merchants carry on their operations all over the world, and do the carrying business of other nations more efficiently and economically than they can do it for themselves. Vast capital is employed for this purpose, and British ships and British seamen still retain the confidence of the world generally. It is unquestionably hard that a nation which has done but little in the way of enterprise, and the opening up of trade and civilisation, which has hardly earned its right to be called a maritime nation, should by means of Government gold and not by honest competition try to seize that which British skill and perseverance have fairly earned for British commerce.

At present, the only available weapon for us is remonstrance against a law so unfriendly, and a warning to the French nation that it is by no means certain they will achieve their object. It will not do for us to adopt any retaliatory measures which may assail those grand principles of free trade, under which our commerce has grown and flourished. If the measure should become law, we fear there is no resource for us but to grin and bear it as best we may, and we presume that, if the business of any individuals is injuriously affected by it, they will have to turn their energies in other directions. We know this is small consolation to offer, but really there is nothing to be done, and it is worse than useless to advocate action which, though it might appear to have a countervailing effect, would in the end produce results of a more mischievous character than the evil sought to be remedied.

But if we can offer no consolation to those whose interests may be directly prejudiced, we may on the other hand point to the fact that the proposition of the French Government is not likely to inflict any permanent injury on British shipping generally. The French Mercantile Marine never has been and probable never will be in a flourishing condition. Frenchmen have a national antipathy to the sea, their mode of life, their physique, their instincts, are all opposed to the hard work and fare of a sailor's existence. They live in an enervating latitude and love the showy and superficial rather than the hard results of patience, perseverance, and work. Sea-sickness, exposure to cold and danger, and the numerous other hardships which have to be borne by sailors, have

great terrors for the ordinary Frenchman, and no bounties will ever effectually conquer this inherent weakness. The French people may be taxed over and over again to provide money for the bounties, but no bounties will ever provide the sailor spirit and the vigour of maritime enterprise, without which all shipping adventures must be unsuccessful. With inflated supports, the bounties may, for the term of ten years proposed, buoy up the French Mercantile Marine and keep it from sinking, but, on the withdrawal of the floating medium, it must sink from sheer exhaustion.

One of the evils to which the Glasgow Memorialists refer is, that many British ships may be transferred to the French flag in order to obtain the running bounties. To us, this does not appear altogether in the light of a calamity. If British ships should be transferred to the French flag, the price to be paid for such ships by French owners would be necessarily above the ordinary market value in consideration of their bounty-earning properties, and this enhanced price would most probably be utilised in building new ships in Great Britain to take the place of those transferred. Thus our shipbuilding trade would receive a very beneficial spurt and the French bounty would find its way into British pockets. Let it be granted that a whole fleet of British vessels were so transferred, it would undoubtedly give an impetus to the French carrying trade for a time, but unless the bounty is to be kept up permanently, sooner or later the time will come when the trade so gained by the French Marine will drift away into the hands of other competing nations, the most prominent of which will be ourselves, and once again there will be weeping and wailing over the decadence of the French Mercantile Marine. Probably a re-transference to the British flag of the ships bought when the bounty was instituted would follow, but there would be this difference, that the price paid for re-transfer, would be very much less than that paid for transfer.

As regards the question of expediency of taxing all other French industries for the special support of the Mercantile Marine, we should think that the French people will not long tolerate the arrangement, especially if many foreign vessels join the French

flag. The people would not fail to see that their contributions were either making the fortunes of some few men, or in truth assisting their powerful rival across the channel, and that the permanent prosperity of their Mercantile Marine was fictitious and illusory. They would also probably become aware of the fact that the bounty system encourages men to qualify to obtain the bounty rather than to develope a trade, and that men without any practical knowledge of the shipping business will enter into it for the sake of obtaining the bounties.

If the French people could now see that the measure is not likely to be so beneficial to them as it has been represented, and that it must necessarily be attended with numerous drawbacks, it is probable that it would never become law; and the best thing therefore that can be done on our part is to indicate the unfavourable features of the proposal. But if it should, nevertheless, pass into law, we must say that, although it would probably inflict some loss upon individual traders, we do not think it would be attended with results so disastrous to our national interests as some people seem to fear, and that it certainly is not calculated to be of much real benefit to the French Mercantile Marine.

RICE CARGO FROM RANGOON.

TO a steamship master bound for the first time to Rangoon for a rice cargo, a few remarks by one who has been in the trade for a number of years may be found of some service, as rice, like everything else, has its peculiarities; by studying which a good cargo may be landed at the port of destination, by neglecting them constant anxiety is entailed during the passage, and your ship's character injured in Burmah.

The rice exported from Rangoon is grown in the districts intersected by the Irrawaddy and its tributaries, the paddy being mostly brought down in native boats. It is sold to the highest bidder, [illegible]n milled to suit the market for which it is destined, and [illegible]ped off.

The season generally commences about the 15th or 17th January, and work goes on incessantly, milling and loading, up to about the 15th April, about which date the hardest of the work may be said to be past, the shipping in the port is thinned down, and the mills are then employed turning out white rice for the Continental markets.

To give some idea of the magnitude of the rice trade from Rangoon alone, the Custom House returns show that from the 17th January to the 1st May of this year (1880), about 200,000 tons left the port; the greater portion of this was distributed over the United Kingdom and the Continent of Europe, the remainder to the Straits Settlements, and South America.

The boats which bring the paddy down are placed alongside the mill of the purchaser, and a standard basket is passed in and filled, its contents levelled down with a stick, then emptied into a big basket and trotted off to the mill on the head of a coolie, the proprietor and broker keep tally, and on the boat being emptied the cash is paid down; this goes on incessantly until the boats are exhausted.

Now the mills go round and the paddy runs through and is husked, the husk is run into a wooden shoot by which it is discharged into the river, and the rice is mixed with paddy in the proportions of 80 per cent. rice to 20 per cent. paddy, and is let down through a close wooden shoot to the mill godown, where it is bagged and stitched up preparatory to shipment.

A single, thick gunny bag is all that is used, and when it is filled will turn the scale at 220 lbs. The name given to the mixture is "cargo rice."

The reason why paddy is mixed with the rough rice is to keep the piles apart from each other, and thus secure better ventilation. Experience has proved that a bag of this cargo rice will reach home in much better order than a bag of pure rough rice would, more particularly at the beginning of the season when the grain is comparatively soft.

A bag which leaves Rangoon for London, via the Suez Canal, weighing 220 lbs., will not turn out more than 216 lbs. at its destination.

A

When the cargo gets home it passes into the hands of the miller again, who runs it through the mill and husks all the paddy in it; then it is put through again and again, until all the purplish cuticle which covers the kernel is removed. It is then polished and becomes the white rice we are accustomed to see in the shops.

The refuse is worked up into various uses, such as food for cattle and bill-stickers' paste, and what grains are broken in the milling are converted into starch, so that nothing is wasted which pays freight.

The master of a steamer arriving in Rangoon for a rice cargo, and with a day or two to spare, could not do better than make a careful inspection of his holds. If coals have been in them and they want washing out, do it on the last of the ebb, for then the river water will be almost fresh.

Make a careful survey of all coal-bunker bulkheads, to see that there are no rivet-holes unfilled in them, as an empty one may be productive of much evil, for a rice cargo gives off so much heat and moisture that the rush for the air-shafts and ventilators is naturally great, a craving for air to supply the vacuum thus generated is constantly going on in the hold, and I have known one case in which almost fifty bags of rice were classed "coal stained," all caused by one empty rivet-hole in a coal-bunker bulkhead.

See that there is not a drop of water left in any of the corners, or on top of the stringers, as rice is a most peculiar cargo to handle. Keep it dry, and it will not cost you one anxious thought, but get a little of it wet and decomposition sets in rapidly; a most intolerable stench is given off, which will search through every corner of the ship, and the paint work will become blackened by the gases set free by it, besides, there is very great danger that fire from spontaneous combustion may be the sequel to wet bags. Heat is generated very quickly after rice and water have come in contact.

If the floors of your cabin, forecastle, and store-rooms are of wood, see that they are well caulked, so as to prevent as much as possible ingress from the damp, steamy air from the rice. If it gets access to them, the health of all will not only suffer, but your

stores will go bad, and ropes and sails perish long before their time.

In dunnaging the bottom of the ship, whether with teak blocks, planks, or your own dunnage wood, keep it well apart for the sake of ventilation, and wherever you can thrust a stick of wood in betwixt iron and the mats, do it, as the air spaces left at the sides of the wood will all help to conduct the heat upwards. Bear in mind that the object to be aimed at in stowing a rice cargo is to induce all the heat of the holds to come up the hatches, air shafts, and ventilators, where the temperature below does not differ much from that of the air on deck, but when cold weather sets in, use all endeavours to induce the steam to fly to the ship's sides, where it will be speedily condensed, and run back into the bilges.

East of the Suez Canal, by keeping the hatches off and the ventilators trimmed, the heat ascends; west of the Canal great care is requisite. On warm, sunny days the hatches may be taken off with advantage; on cold, gloomy ones they are better on.

Put good mats and plenty of them in the bottom of the holds, as no matter how carefully you take your rice in, some bags are sure to burst, and the mats at the bottom pick up all the loose rice, and prevent it ultimately getting into the bilges.

As to matting the sides, opinions differ. I think vertical sparring nailed to the fore and afters, with little or no matting, will be found the best, excepting at the edges of the upper wing tiers. These cannot be dispensed with, unless we can hit upon some sort of composition, to coat the under side of the iron deck and stringers with, which will act as a non-conductor of heat.

The principal trouble now with rice is that on getting into cold weather a quantity of the steam condenses on the under side of the iron deck and beams. This gradually gathers till it forms into great drops, the ship rolls, and the drops still clinging to the iron run down to leeward and fall off, some on to the ship's side, the rest on the bags and mats.

Mats up in the sides soon get wet through and rotten if this continues long, and it generally happens that the bulk of the damage done to a ship's cargo is in the upper wing tiers, under the deck, and under the stringer plates.

I have tried folded blankets in one portion of the ship, but they were worse than the mats, they certainly sopped all the water up, but the bags beneath them drew the moisture all out of them.

A wooden deck will not retain moisture like an iron one.

The system of loading a cargo in Rangoon is, to lay down five heights of bags fore and aft the hold, then parallel to the keel, and midway betwixt the centre line and the sides, to place wooden ventilators on edge (supplied by the shippers, as well as ventilator boards) at right angles to them, and about five paces apart others are laid from side to side, intersecting the fore and aft ones, and all opening into each other; then vertical ones are placed having their lower ends resting on top of one of the junctions, and their upper ends placed inside the ship's iron ventilators, others are placed at the four corners of all hatchways.

Then, up and down the midship stanchions, fore and aft the ship, ventilator boards are lashed, one on either side, and kept a little apart, so that when the ship is loaded you can stand in the upper hatchway and look down through the slit betwixt the boards to the keelson.

After the first tier of ventilators are in, work goes on again until other five tiers have been added, then come more ventilators, and so on till the ship is full.

Some of the rice shippers at their own expense mat the top of the bags fore and aft to prevent them getting soiled.

A bag with 220lbs. of grain in it is bulky, and as they are pretty tightly filled it will settle down considerably; so much so, that although stowed close up to the beams in Rangoon, a small boy could crawl fore and aft the cargo in the channel; therefore you will find that if your ship is carrying a press of sail coming across the north-east Monsoon, the cargo will settle to port, and if your coals are burned evenly off each side you will have a considerable list that way by the time you reach Aden.

The settling is most rapid the first week out, after that it gets slower, and if you have light winds at the commencement of the voyage it may not amount to much afterwards.

I know one steam company which makes it a rule that each of ɪeir vessels is to have a margin of 100 tons coal above the esti-

mated consumption to reach the various ports. The comfort conveyed to all on board must be incalculable, for with plenty of coals in the ship you can trim her any way you like.

What anxiety the man must have nearing home whose ship has a strong list to port, while a gale of wind is blowing on the starboard beam, and all the coals in the starboard bunker. If the ship were fitted with water-ballast tanks, of which the port and starboard ones were independent of each other, the desperate venture might be tried to fill one of the weather ones. It might succeed, but while it was filling, what a fearful risk lest, when it was half full, the mass of water rushing from side to side might render the vessel unmanageable and cause her to founder.

With a ship divided into three cargo compartments, two large and one small, and with four ventilators in each of the large ones, the heated air will always be found struggling to windward.

Going head to wind, if the two foremost ventilators be turned with their mouths facing the wind and the two at the rear of the hold turned from it, a quantity of heat will be found coming up the after ones, but not much; reverse the process, and you will be astonished at the rush which will come up the forward ones. In like manner, if the wind be off the starboard side, the heat will all cling to that side; this will be more perceptible in cold weather, as you will find drops of sweat clinging to the deck and beams on the weather side, while down to leeward will be dry.

Be very careful in taking off hatches in cold weather, as you are likely to do more harm than good. The moment the hatch is off a burst of heat comes up, but this is succeeded by a rush of cold air down, and if there has been any sweat gathering on the under side of the deck it will quickly develop into large drops and rain down on the cargo.

Frequently more harm is done the first day you begin to discharge in the docks than what has been done all the voyage, for the sudden opening of all the hatches to get the cargo out lets in such a rush of cold air that sweat drops form on every particle of iron within its influence, and a long roll of first class damages are added to the list, which on a warm day might have been slight.

Use every endeavour to prevent wet or damp bags coming on board. Boatmen are not over careful in handling buckets of drinking water. If through negligence a wet bag comes in you will find it again on arrival home, and its position well defined by a ring of damaged bags round it.

Shippers will only accept clean receipts, therefore you are at perfect liberty to reject any bags you may be suspicious of.

Towards the end of the season there is not so much risk of your cargo heating, as paddy coming from far distances inland, and arriving late, is much drier than that grown near at hand, and placed in the market soon after the harvest.

Besides, a late cargo is often a mixed one, for, when the first rush is past, and the mills only working regular time, quantities of "white rice" are made for the Continental markets, so that a cargo may consist of white rice, "coodie" or broken rice, cargo rice, and rice meal. Coodie is the heaviest, white rice next, then cargo rice, and lastly the meal.

A sailing ship is ventilated differently to a steamer. Having but one hold, the small ventilators would not be sufficient. The system is, to stow in five heights fore and aft, then midway between the centre line and the side, to strip out one row of bags from end to end, and at intervals single rows athwartships; this leaves broad, deep gutters, fore and aft and across. These are bridged over with bits of wood, then more cargo is stowed in until the next series of gutters is to be formed, and so on till the cargo is loaded; this secures good ventilation through the ship.

Some ships omit the athwartship gutters altogether. Great care is requisite in taking in the cargo, to sew up any bags that may burst, at once, as loose rice getting into a gutter, or ventilator, will check the circulation of air, and hinder the clear ones from doing their duty as they ought.

If, through keeping your hatches off for ventilation, a spray should find its way to the bags, mark the wet ones before putting the hatches on; the first fine day get them up on deck, open them out and thoroughly dry the contents, and re-bag it. Never mind whether the bags are discoloured when you get home. Tell ...nkly how it happened, as the rice will have to be milled over

and over again; the grain will not be any the worse if dried quickly.

Never think of leaving wet bags to rot in the hatchways, while you trust to your log book and protest to get you out of the scrape.

J. McKIRDY.

ON COMPASSES, AND THEIR ADJUSTMENT IN IRON SHIPS.

(*Continued from p.* 650.)

IT may be as well to take a summary of results, and add a few notes.

Every bar magnet or magnetised needle has two poles, one of which differs in quality or property from the other. One is the north seeking, or *red* pole, and the other, which is directed towards the south, is called the *blue* pole. *Like poles repel*, and *unlike poles attract, each other.*

The position of the poles is not at, but a short distance within, the ends of the magnet, generally about a twelfth of the length of the bar from the ends; but the thinner the bar the more nearly do the poles approach the ends.

Permanent magnets are made of the best steel, which should be perfectly hard throughout the length of the bar, and the steel which is most likely to retain its magnetism unimpaired is that which, when magnetised, developes the greatest power.

A horse-shoe magnet is only a bent bar magnet.

There are various methods of magnetising steel bars or needles, by single touch, or double touch, but the best and most expeditious way is to place them within the coil of a voltaic battery.

There is a limit to the magnetic power of every steel bar or needle, and when it has taken its full dose it is said to be magnetised to saturation; but in time it is sure to lose a portion of its magnetic power.

The bar magnets used in adjusting ships' compasses are cased in brass or copper, but the latter metal is the best for the purpose.

Steel and iron of all kinds may become magnetic *by induction*—by being in juxtaposition with permanent magnets, or through the earth's magnetic influence—but all kinds are not equally susceptible. It is only *soft iron* which instantaneously acquires, by induction, magnetic properties, and as quickly loses them on removal of the cause, or by change of position. Standing vertically, or nearly so, the effect on the compass of vertical induction in soft iron is the same as that of a permanent magnet; when horizontal, its effect in one sense is diminished, but its influence on the compass is then most detrimental, since it interferes with the directive force of the needle.

Hard iron, however, has a capacity for the reception of magnetism through continuous and heavy hammering; it is equally capable of retaining it, but in diminishing amount, after the exciting cause has ceased, and its character is never wholly lost. This has necessitated a new name. "The magnetism of a struck iron bar resembles the magnetism of a permanent steel magnet in all respects but this, that, while perhaps no change can be remarked in hours or days, it infallibly diminishes in a long time. To express this partially permanent character, the term '*subpermanent magnetism*' has been adopted. In single bars, the subpermanent magnetism diminishes sensibly in a few hours, and is lost in a few days. In some large iron ships, a portion of it has remained unaltered for many years. It would seem that where the operation of magnetising by hammer-blows has been rapid, the magnetism is not very firmly fixed; but where the violence has been long continued, the magnetism is so firmly established as to become an immovable quality of the iron."—Sir G. B. AIRY'S *Treatise on Magnetism*.

The effect of the earth's magnetism on the compass needle is merely directive.

The direction of a freely suspended magnetised needle—that is of a needle free to move horizontally and vertically—is the visible pression of the direction of the earth's magnetic force; and

this force is determined through three magnetic elements, (1) the *intensity*, (2) the *declination*, or, as it is more generally called, the *variation*, and (3) the *inclination* or *dip*. But the three elements are separable though intimately connected with each other.

The *magnitude* of the magnetic force, called its *intensity*, is determined by the vibrating needle.

The *variation*, as shown by the horizontal needle, is the angle through which that needle declines from the geographical meridian, and is the outcome of the magnetic poles of the earth not being at the ends of its axis.

The *dip*, as shown by the dipping needle, is the angle through which that needle is inclined to the horizontal plane.

These elements having been determined for any given place, the effective action of terrestrial magnetism at that place is known and defined. But all are subject to disturbances or change, classed as secular, periodic, and irregular; none of these changes, however, affect the compass considered as an instrument of navigation, except in time.

With the *variation* of the compass the mariner is well acquainted, as it comes under his cognisance every day.

But the *dip* is not so apparent to him, and yet it plays an important part in connection with the changes in the compass which are due to the iron of the ship. The globe is divided into two magnetic hemispheres—a northern and a southern one—by the *magnetic equator*, or *line of no dip*, along which the magnetised needle rests horizontally. This line cuts the terrestrial equator in two points (not equi-distant)—one being on the African side of the Atlantic—the other in the Pacific, in about long. 164° W. Receding from the magnetic equator—where the dip is 0° and consequently the horizontal force greatest—the red pole of the magnetised needle inclines downwards in the northern hemisphere, and the blue pole similarly inclines in the southern hemisphere; the inclination continues to increase more and more until the earth's magnetic póles are attained—where the dip is 90°, and the needle stands vertically; and where the vertical force is at its greatest, the horizontal force is *nil*. The lines of equal dip in low

magnetic latitudes are not very irregular, but as they approach the magnetic poles they become more and more unsymmetrical in consequence of these poles being neither diametrically opposite to each other, nor coincident with the geometrical poles of the magnetic equator.

The globe is also divided into two hemispheres by an undulating line, called the *equator of force*, which passes through all those places where the *magnetic intensity* is weakest; it coincides with neither the terrestrial, nor the magnetic, equator. The intensity everywhere increases in receding from this line, on either side, towards the higher latitudes. This is also an element to be considered in connection with the compass in an iron ship.

The iron of which a ship is constructed is neither wholly hard, nor wholly soft, but of an intermediate character; and the more nearly it approximates to hard the more capable is it of the retention of magnetism when it has been submitted to any process of magnetisation. This is accomplished while the ship is on the stocks, building; when magnetism more or less intense is developed by the bending, twisting, and hammering to which the iron is subjected; and so far as the hull is concerned it is of that kind which is now usually called *sub-permanent*, because it has not the precise persistency of a steel bar-magnet. The *magnetic* direction in which the hull lies while on the stocks determines the quality or character of the impressed sub-permanent magnetism, and the amount of hammering and straining of the iron while in that particular direction determines its quantity.

Previous remarks have already shown that position plays an important part in connection with magnetic action, and since the dip of the needle varies between 67½° and 72° in the latitudes where our building yards are situated, it follows from the direction of the ship on the stocks conjointly with the hammering of the iron, that *red* magnetism (*i.e.*, of the North-seeking kind) is developed in that part of the ship which is below and towards the North, and *blue* magnetism in that part which is above and towards the South.

Fig. 5 represents the magnetic character of a ship built head North; the nearly vertically line halving the length of the ship is

the line of the dip, and the irregular dotted line may be taken as an

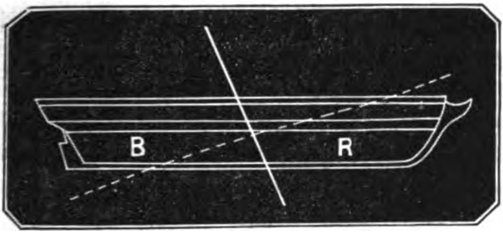


FIG. 5.—SHIP BUILT HEAD NORTH.

equatorial plane at right angles to the line of dip and passing through the body of the ship. This equatorial plane separates the *red* (R) from the *blue* (B) magnetism, the *red* being below and towards the North, and the *blue* being above and towards the South; the *blue* magnetism is consequently well developed towards the after part of the ship. When the compass is aft this distribution of magnetism causes the North end of the needle to be strongly attracted towards the stern, but less so as the compass is carried forward, until, on approaching the bow, the North end of the needle is repelled, and the South end is attracted.

Fig. 6 represents the magnetic character of a ship built head South, and is the reverse of Fig. 5; here *blue* magnetism is

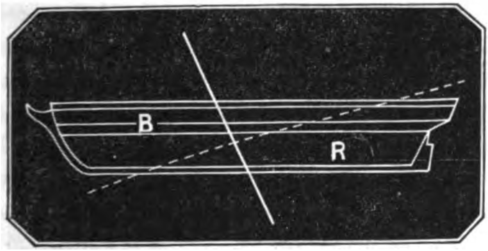


FIG. 6.—SHIP BUILT HEAD SOUTH.

developed towards the bow, and *red* towards the stern, causing repulsion of the North end of the needle in a compass placed aft, and attraction towards the bow when placed forward.

Fig. 7 represents the magnetic character of a ship built head East, in which the whole of upper part of the ship has *blue* magnetism, and the whole of the lower part *red;* but owing to the greater development of the *blue* on the starboard-side, the North end of the needle is attracted to that side, and this occurs on every part of the deck from forward to aft.

Fig. 7.
Ship Built Head East.

Fig. 8 represents the magnetic character of a ship built head West. It is the reverse of Fig. 7 in this, that owing to the greater development of *blue* magnetism being now on the port side, the North end of the needle is attracted to that side, and such is the effect on every part of the deck from forward to aft.

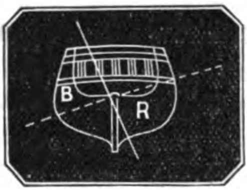


Fig. 8. Ship Built Head West.

This disposition of magnetism and its results as here described, appertain to the Northern hemisphere.

The equatorial plane rising to the deck—forward in ships built head North, and aft in ships built head South—might lead to the supposition that if a compass were placed in one or the other position the needle would not be affected by the magnetism of the ship; it is well to place a compass aft in ships built head to South, and as far forward as possible in ships built head North; but the line or space along which the magnetism of the ship has no influence on the needle is not easily discovered, and if it were ascertained for any given latitude it would be found to have changed on reaching another magnetic latitude.

An iron ship built in the Southern hemisphere would be affected somewhat differently from what has been stated above,—to the extent of *blue* magnetism being below, and *red* above.

To what end is it necessary to study the distribution of magnetism in an iron ship?—To ascertain and understand its effect on the compass.

You know that variation is the amount by which, at any given ...ce on the globe, the compass needle points East or West of the

true North, and that it does this owing to the magnetic poles not being co-incident with the geographical or true poles of the earth; but deviation is the amount by which the compass needle deviates from the *magnetic* North; and it differs from variation in this—that it is not of the same amount or name for every point of the compass. If an iron ship be considered as a magnet which acts on the needle as the earth does, then the needle will be acted upon by the combined forces of the earth and the ship, and will assume a direction depending upon the mechanical resultant of those forces. Thus, take the case of a ship's magnetism acting in such manner that the needle is attracted towards the bow; so long as the ship's head is directed to magnetic North, the action of the ship and the earth being in the same azimuth, the needle will not deviate, but on turning the ship's head East, the needle will be drawn by the earth's force towards the North, and by the ship's force towards the East; hence it must assume a position between North and East depending upon the relative amount of the two forces. This is what is called the deviation of the compass, and it changes its amount and name with change in the azimuth of the ship's head.

After launching, much of the sub-permanent magnetism that the ship acquired during building is shaken out of her, and within two or three years it obtains a certain stability; but it is a stability in which, though the quality of the magnetism does not alter, it is liable to change in quantity, according to the magnetic character of that part of the globe in which the ship is navigated.

Intimately connected with every iron ship—and more especially with a steamer—are iron bulkheads, beams, stringers, and longitudinal strengthenings; besides which, there are deck-houses wholly or partly of iron, the engine, funnel, cowls, stanchions everywhere, cranes, davits, &c.; of this iron, all that is in a more or less vertical position, and subject to vertical induction, affects the compass as would a magnet,—acts with or against the sub-permanent magnetism of the hull of the ship, increasing or diminishing its effect; were this the only result, the problem, although there must be change, and change with a difference, would not present any serious difficulty in the investigation; but, on the other hand, it becomes more complicated when the effect on

the compass is the resultant of the action of large masses and numberless pieces of iron in different positions, and liable also to change of position.

The formula generally accepted for the solution of the effect of a ship's magnetism on the compass is that deduced by the late Archibald Smith from the earlier investigations of Poisson, Sir G. B. Airy, and others; it is as follows:—

$$d = A + B \sin z + C \cos z + D \sin 2z + E \cos 2z$$

in which d is the deviation to be determined; z is the azimuth of the ship's head by the disturbed compass; and A, B, C, D and E are co-efficients (or temporary or local constants) the value of which has to be determined by experiment or trial.

The interpretation of the formula is this, that knowing the value of the co-efficients in *arc*, the deviation on any given point of the compass, say N.N.E. (which is *two points*), is as follows:—

A (the constant), *plus* B times the *sine* of two points, *plus* C times the *cosine* of two points, *plus* D times the *sine* of four (*i.e.*, twice two) points, *plus* E times the *cosine* of four (*i.e.*, twice two) points;

but in the manipulation of the formula attention must be given to the law of signs in the different quadrants in conjunction with the signs of the co-efficients; these signs, as applicable to the different quadrants of the compass, can be illustrated by diagrams of sufficient simplicity.

W. H. R.

(To be continued.)

OUR SEAMEN.

To the Editor of the "Nautical Magazine."

SIR,—As sailors we are necessarily ignorant of much that is taking place outside the little floating world in which so large a portion of our life is spent, and where our knowledge of *past* events is gleaned from *old* newspapers, magazines, &c., for our spare hours at home are too few and precious to waste in studying current news or politics.

During nearly thirty-five years active seafaring life I have but once voted for a member of Parliament, and there are doubtless thousands of seamen who, like myself, are perforce content to see others think and work for us, realising the probability that those "others" by living on shore, and making our welfare their special study, may acquire a more general knowledge of our requirements as a class than we ourselves who work in such a mole-like manner.

We have an effectual leading light in your esteemed magazine, and I have to thank it for my knowledge of the many efforts that are being made to conduce to our moral and physical welfare and safety. The perusal at sea of many of the articles therein contained has caused me to envy, as well as admire, the facility with which the writers "coin their thoughts into words," and place vividly before us ideas and facts which are in strict accord with our own knowledge of the truth.

But, Sir, whatever may have been your motive in publishing an article by Captain Dawson, R.N., on the Merchant Seamen Bill, 1878 (in your November number for that year), it is plain that the views expressed therein were not such as generally characterize the articles appearing in your pages. I can hardly think that the author has succeeded in recording his convictions, when he conjoins legislators and employers with crimps and publicans, as the natural foes of seamen, and charges with annual wholesale manslaughter, if not worse, the class in whose interest he is writing. There can be no danger of your "constant readers" being misled by the article in question, as to the character of employers or seamen, but there are many non-nautical men deeply interested in the Merchant Navy, who may be led to form very erroneous conclusions through Captain Dawson writing from insufficient data, or being unfortunate in his choice of language. His own quotations from shipowners' evidence afford a sufficient refutation (were it needed) of the charges direct and implied against them.

Figures are misleading, and though it would perhaps be advisable that reports of deaths at sea should be referred to the health officer of the port (if the custom does not exist), and an inquest

held if necessary before the crew separates, yet there is a sure (though very undesirable) guarantee that no case of cruelty or neglect can escape inquiry, in the spirit of antagonism unfortunately existing between master and men, and which the article in question is only too well calculated to foster. I have read of a lawyer repeatedly referring to a witness in court as "this soldier." Annoyed at having his rank wilfully ignored, the witness exclaimed, "I am not a soldier, I'm an officer." The lawyer continued, "This officer, your Honour, *who is no soldier*," &c. If we were not pre-disposed by pride to think we ceased to be sailors on becoming officers, there is much in our surroundings to teach us so. Not only do well-meaning people teach that the interest of employer and employed, master and men, are opposed, but the tendency of the law or its administration is (or was) to do the same, and the seaman is practically taught by shipping masters that their vigilant supervision is needed to prevent them being overreached by employer or master. No alteration is allowed in the Seaman's Act of wages except in his favour. At one time (about 1866) the shipping master at Sunderland was instructed not to answer any questions or *give any information* to shipmasters; this may, perhaps, have been a local arrangement, but irrespective of this the shipping offices were appointed by Government solely to protect poor simple Jack from his designing employer and shipmaster. I believe this impression is dying out, and that while careful to protect the sailor's interest in every possible way, the shipping office officials are more willing than of yore to act for and on behalf of both employer and employed, and may grow in time to be regarded as Government agents introducing labour to capital.

But while unconsciously contributing to foster Jack's suspicious discontent, no one acquainted with the numerous and careful precautions taken by Government to protect him from robbery, and induce him to bank his earnings, could truthfully accuse it of forcing him into the hands of crimps, &c. This is no place to describe the *cordon* of protection that has been thrown around him, nor the precautions taken that he may not remain in ignorance of his advantages; they are apparently complete, and if the thought-

less, dissolute sailor (those practising sobriety needing no other protection) succeeds in spending his money in low-classed boarding-houses, &c., it only proves that *to him* they are a necessity; the surroundings are congenial, the same men using the same houses after repeated voyages; they are, in fact, co-existent and mutually dependent, and not seldom the boarding-master and runners are ex-sailors. Equally removed from the truth is the assertion that at the conclusion of the voyage the sailor is dismissed penniless from his ship and deprived of work, and "is thrown of necessity into the hands of the crimp for food and lodging." The fact is, the utter impossibility of keeping him on board has *alone* made it a necessary custom to *let him go* immediately upon arrival, and if he leaves the ship penniless it is because he will not wait a few hours until money can be obtained by the master (which for obvious reasons is not carried on the voyage), the greatest difficulty being experienced by the officers to keep the men until the ship is safely moored. The *natural* desire to get on shore after a voyage we share in and do not complain of, but we do complain that the haste to gratify it in the sailor in order that he may do so *lawfully* should be construed into a charge of heartless greed. So universal is the difficulty of getting the sailor to remain on board in harbour, that practical shipmasters are now advocating their immediate dismissal on arrival at ports in British colonies. This I should be sorry to see become a custom, as it would conduce to restless, improvident habits among the men, and the frequent payment of wages during the voyage would have the same ill effect. Shipmasters have now a great difficulty in preventing their crews from squandering their wages during the voyage, for money *is advanced in every port*, although British Consuls give formal notice to shipmasters that they (the shipmasters) will be held responsible for Jack's misdeeds should he be granted *money or liberty*.

I am glad to learn from your journal, Sir, that there is no immediate danger of alteration in this respect. To assimilate the system with that in vogue in the Royal Navy would invite desertion, and, by removing the greatest surety for good behaviour and due fulfilment of contract, prove a curse instead of a blessing to the class whom it is contemplated to benefit. I am not quite

sure that Captain Dawson advocates this change, but merely desires to have the allotment note made compulsory. The North country shipowners allow the men to have their choice of advance or half-pay, and I can testify to the consistency with which the former has been discountenanced by the Board of Trade, while encouraging, *endorsing*, and facilitating the payment of the allotment-note. I am sorry to learn (for the first time) from the *Nautical Magazine* that there are shipowners who refuse to grant it, perhaps in particular trades where the practice has been abused; but under the existing system, the men who would choose half-pay are those with wives or parents depending upon them, and who would be least likely to desert; to deny them is an injustice that could be remedied without injuriously affecting the interest of employers. But I fear that making the granting of allotment-notes compulsory and *prohibiting* the advance-notes will constrain the "waifs and strays" of our profession to obtain allotment in favour of apocryphal sisters, cousins and aunts (*alias* boarding mistresses, &c.), and increase their tendency to desertion and insubordination in order to get their half-pay stopped at the first opportunity, or we shall have the ill-effects of the "dead horse" extended through the voyage.

The advance-note *is* an undoubted evil, but it has become almost a necessary one to the long voyage sailor, and after all, the practice of discounting our probable earnings is not peculiar to seamen, and I am afraid it is not in the power of legislators to make the reckless seaman more thoughtful and provident than his counterpart on shore, who has not his food and lodging provided for an indefinite period. It is said that the advance-note furnishes an incentive to the crimp, outfitter, &c., to defraud, and extreme cases of (apparent) extortion are quoted by Captain Dawson; but there is given, at the same time, in the evidence of Dr. Commins, barrister, of Liverpool, a slight glimpse of how different "the other side of the story" would read, could it be elicited from Jack's natural enemy. My own knowledge of the character of the men who ship with ragged kit enables me to realise how possible it is for much sympathy and indignation to be misspent.

I am not writing to defend the crimp, boarding master, outfitter,

&c., but we should look at both sides of the question, and remember that equally with (perhaps more than) soldier and sailor they need the sympathy and help of those who have the welfare of their brother man at heart. I do not write this in the "man and brudder" spirit that you, Sir, speak of. I acknowledge that they are miserably poor relations, and that it is not desirable to be on visiting terms with them, but I can truthfully say the same of some of their victims; and I believe that any attempt to benefit the dissolute sailor would be more likely to succeed if attended by a corresponding effort on behalf of those who depend upon them for a livelihood.

It is not the law (except in so far as it encourages the sale of his greatest enemy, alcohol), the crimp, boarding master, Jew clothier, or shipowner that condemns the sailor to poverty and vice and pauperises his family, but his individual character, fostered, doubtless, by his surroundings and restless mode of life. But the reckless dissipated sailor would probably have made a drunken loafer on shore, and if we have more than a fair per centage of such characters, is it to be wondered at considering the many objectionable sources from which our service is recruited? Not only do we get the spirited adventurous youths from happy homes, but those from reformatories, together with the rejected and dismissed from the Royal Navy. While the intractable, incompetent, and discontented of nearly all classes seek it as "something new," and for the opportunity it affords for throwing off irksome restraint and giving way to evil propensities.

In "a far country," some of these men (and boys) fathom the lowest depths of human degradation, and with great capabilities for good, excel only in evil; good, honest, content-giving work is their abhorrence, discontent and insubordination their normal state. Kindness makes no apparent impression on them, they are "bad from wilful badness," and labour only to make others likeminded, succeeding only too well, for there is a proneness in seafaring youth to regard defiance of lawful authority as evidence of courage and manliness. They teach that drink and its concomitant evils are a desirable or necessary part of a sailor's character, and will readily steal and sell ship's stores or cargo to gratify their depraved

appetites; they do not often desert, but, "wise in their generation," prefer being *paid* off into gaol, which has (comparatively) no terrors for them, or they malinger to get paid off into the hospitals. A fine or forfeiture of wages is their greatest punishment, for their only object in signing articles is to get the means of indulging in periodical debauchery.

It is an unpleasant picture, but fortunately it is true of a limited number only. No good purpose can, however, be served by ignoring their existence, or by speaking, writing, or legislating as if every seaman were the realization of the ingenuous typical sailor of a brave and noble spirit, the pet of humanitarians, and the pride of British sentiment. Any alteration in the laws that would help to lessen the few restraints left for such characters, would not only be an injury to themselves (by forcing that character and encouraging those gravitating towards it), but to the better disposed men also, who are always more or less involved in the consequences of the others' recklessness; and by unduly harassing the conscientious shipowner, cause shipping property to fall gradually into the hands of unscrupulous people, who will be less likely to bear patiently with "Jack's" shortcomings, or to follow the good example now widely set of consulting his comfort and welfare by improved dietary scale, unexceptionally comfortable lodgings, good conduct money, &c.

All shipowners are not full of philanthropic zeal, but there are very many who would heartily co-operate to introduce reform if once convinced that the proposed alteration would permanently benefit and improve the "morale" of the service.

Shipmasters and those aspiring to become such (as the most intelligent of seamen) ought to be the protectors and educators of those less gifted, and should hail with great satisfaction any measure that will contribute to the welfare and happiness of the class from which they have risen, and upon whom their hourly safety and comfort so much depends. They often know from experience the causes that conduce to the deplorable state of ill-feeling which too often exists. Where crews are leavened with characters watching for an excuse to "strike," and who are only restrained from active insubordination by the continual exercise of much tact

and forbearance, they know how impossible it is to *constrain* such men to do their duty by fear of *distant probable penalties;* and from their knowledge of what prejudices their own character are able to buoy and beacon the rocks and shoals of our profession, and cultivate in the "rising generation" a more healthy, cheerful, and contented spirit, teaching them to identify their interest with that of their employers, and not regard them as enemies from whom they need to be protected.

I believe that the *individual officers* who are most *consistent* in endeavouring to improve the character of the sailor, will be found the most trustworthy and profitable servants for the employer; it is, too, a labour that brings its own reward, for it is a true though trite saying, that we cannot benefit others without benefiting ourselves.

Shipmasters' Societies, in addition to looking after the immediate interests of masters and officers, might do much to forward a more desirable feeling between men and master, by forming themselves into a kind of nautical parliament, and taking into *leisurely* consideration suggested alterations, such as rate and payment of wages, improved lodgings, alteration in diet and cooking, rating and disrating, shipping and discharging, official log book (readings and entries), punishments and rewards, apprenticeship system, use and abuse of ship chest, &c., and having concluded that an alteration in existing custom is desirable, might submit the result of their deliberations to the Shipowners' Societies (Upper House), who could in due season (if the change acted beneficially) take steps to have the improvement made compulsory upon those too indolent or selfish to adopt it. There are no insurmountable obstacles to their doing this, for members could be invited to give the results of their experience (and then vote for or against proposed reform) by letter, and though some from selfish indolence might take no interest in the matter, your correspondence, Sir, proves that there are others already exerting themselves to improve the physical and moral welfare of those entrusted to their charge.

Employers of labour on shore *cannot* picture to themselves the exigencies of the sea service, and our legislators by passing for seamen measures suited only to men whose time and services can

be clearly defined, and whose absence or refusal to work would not imperil the lives of others, may seriously increase the existing spirit of antagonism, and retard for many years the reform they wish to see carried out.

There is, doubtless, very much to deplore in our Service, but the stronger light that is now breaking in upon it, causes deeper shadows, and we must not expect a perfect set of circumstances from the proverbially unstable element. My experience of the past teaches me to look very hopefully to the future of the sailor. Many useful reforms have been lately introduced, but if those who wish him well would avoid uprooting the wheat with the tares. they must cultivate goodwill and community of interests between employer and employed, and teach that the law is a terror or restraint to the evil-doer only.

Your obedient servant,

A SUNDERLAND (COAL) TAR.

FISHERIES OF COMACCHIO.

THE alterations in the formation of the marshy shores of the Adriatic, better known as the lagoons, are very apparent, upon consulting one of the older maps of the Venetian riverain. It is impossible at the present day to reconstruct the ancient topography of the locality which lies between the mouth of the Piave and the bottom of the Gulf of Trieste, so greatly has the form of the coast been modified; even the lagoons of Venice and Chioggia have only retained a certain permanence of outline by the constant efforts of man; whilst those of Brondolo have disappeared since the middle of the sixteenth century. Southward of the mouth of the Po lies the great lagoon of Comacchio, traversed in many parts by causeways of earth which the streams have created in their devious courses. Over nearly the whole extent there are certain *valli*, or broad spaces of water surrounded by alluvial soil, except in the south-eastern angle where may be seen deep cavities, or *chiari*, into

which the Adriatic continues to flow unchecked. The lagoon of Comacchio, which occupies an intermediate space between *terra firma* and the waters, once extended a great distance further south, forming the lagoon of Padusa, which again enveloped by its canals the city of Ravenna; and the descriptions given by Strabo of this ancient city correspond exactly to the existing semi-insular positions of Venice and Chioggia.

The Padusan has disappeared, but the lagoon of Comacchio covers a superficial area of 50,000 acres, now separated from the sea and from the lagoons of Chioggia and Venice by fresh littoral dunes and the prolongation of the mouths of the Po caused by the fluvial deposits. Bounded on the east by the sea shore, which is generally wooded; on the north by the Volano Canal; on the south by the River Reno, and on the west by the communes of Ostillato, Port Maggiore and Argenta; this singularity in the topography has given rise to an industry that dates from the very earliest times and still remains peculiar to Italy. The Palotta Canal, which conveys the salt water of the sea into the interior of the Continent was formed in the year 1631 to 1634. By its means the vivifying elements are spread to the furthest extremity of the lagoon, as well as by ingenious additions of accessory canals furnished with locks and sluices. The level of the lakes, when the canals are open, follows the movement of the tides, their depth, beneath the mean sea level, is between three and six feet. The various basins fed by the arteries of this canal are filled with an abundance of fish brought up in the salt stream; the double and triple labyrinths which make access easy to the visitor from the larger sheets of water forbid their return; they remain in the reservoirs and when the fishing season commences they are collected by nets and hauled into the boats. The natural expanse of water thus aided by artificial means for this especial purpose, presents a field for the capture of fish unique in the world. These fisheries have existed from time immemorial, but the first contract for farming them out to contractors dates from the year 1566. When the Pontifical provinces were united to the kingdom of Italy, they became the property of the State and were ceded to the commune of Comacchio. After a short unsuccessful experi-

ment of municipal management, they were farmed out to private speculators, and by whom, at the present time, an annual rent is paid to the commune.

Consul Colnaghi describes the lakes as being divided into three divisions.; the first contains five basins and yields the best qualities of fish; the second division for fish of the second quality, contains nine basins; the third division, with thirteen basins, is devoted to fish of an inferior kind. The fish ponds or *valli* are protected by a system of dykes furnished with sluices. At the entrances the so-called *otele*, or *Cavorieri*, ingeniously constructed of boards and canes, are placed to guide the course of the young fish and prevent their return seawards. The principal fishing seasons are, first, in the autumn, when the nights are dark and stormy; the second, Lent fishing, is in the spring; occasional fishing is carried on throughout the year, constituting an important resource for the poor. The fish are caught by various arrangements of stationary and moveable nets, and by means of the trident (*fiscina*). Of the various qualities of fish preserved in the *valli*, the eels are by far the most important, and they are followed by the grey mullet, basse, plaice, sole, razor shell, goby, and young fish of various kinds, called *acquadelle*. The average yearly take of fish from 1792 to 1824 was 22,428 cwts. This quantity between 1824 and 1870 had decreased to 10,839 cwts., owing to the disastrous season of 1825, when 53,000 cwts. of fish died, and to the intense cold of February, 1851, which caused a further mortality. The annual take of eels alone, in the *valli* of Comacchio, exceed 19,650 cwts. The live eels are carried to market or the curing houses by sea, river, or canal, in flat submarine boats called *burchi* or *muriotte*, constructed so as to permit the free entrance of the water into the fish chambers.

In addition to the *valli* of Comacchio there exist other private *valli*, called free or open. On the right bank of the Volano, with which they communicate by means of sluices, are the *vallesina* and the *valli* of Stefano, Riva, Cantone, Bertuzzi, Barlamo, and Val Nuova; on the left bank are the fisheries of Mesola, partly the property of the Roman Hospital of S. Spirito, and in part belonging private owners. The total yield in 1872 from all the different

sources, and including those given to the poor, was 41,761 cwts. To the fisheries of the *valli* must be added the coast fishing and that of the canals and rivers which traverse the province of Ferrara, and especially of the Po, where fine sturgeon are caught. The total amount of fish caught in and on the shores of the province per annum may be calculated at 49,108 cwts. That the fisheries are highly susceptible of improvement there is no doubt, when it is considered that while the lagoons of Comacchio yield only 281 kilogs. of fish per hectare of superficial area, the *valli* Cantone, Stefano, and others, in the hands of private owners, yield an average of 522 kilogs. of fish per hectare.

The fishing population of Comacchio is composed of rather more than 5,000 individuals, almost all remarkable for their tall stature, vigour, and agility. The pisciculturer Coste remarks upon the curious fact than an entire colony in the recesses of the solitary island of Comacchio, isolated from all other places by vast lakes, obliged to seek its living on the water as others do on the land, condemned to live on about three varieties of fish, mullet, eels, and *acquadelle*, has been able for many centuries to preserve its type of race and be as flourishing as the population of rich territories. Unfortunately the fishermen of Comacchio are not the proprietors of their "fields;" the latter belong to the State or rich private individuals. The fishermen obliged to follow this laborious calling live in large buildings on the islands and are not allowed to be visited by their wives and mothers. They return to their homes only at fixed times. Each sheet of water is under the supervision of an official called a factor, who has several employés under his direction, forming altogether a force of nearly 400 men with whom a discipline similar to that on board ship is maintained. There are two busy seasons in the year, the first, when the young eels arrive called "the ascent," the second, when the full grown eels seek to escape, and the efforts they make to attain their object is called "the descent." On the 2nd February communication is opened with the Po, and all passages are left free till April. During these three months "the ascent" of the fish is made obedient to an instinct which carries them along against the tide from the river to the many basins. When the young eels have

reached the lake they disperse into the various basins which they do not think of quitting until they reach maturity—when the same instinct which has induced them to travel so far urges them to return. During the months of October, November, and December great attempts at emigration occur—only effected during dark nights. The fishermen profit by these habits, and spread nets for the fish, catching them in large quantities; they likewise construct small paths at the bottom of the basins edged with reeds, which lead to a species of room also formed of the same material. The full grown eels swimming in these defiles and guided by the insidious paths arrive at the "rooms" according to the fishermen's desires. They accumulate there in such large quantities, that, on certain occasions, a mass has been formed that rises to the surface of the water; there they are caught and sent to Comacchio, where they are sold to the merchants, who cover the fish ponds with their boats; thence they sail along the Po, Ticino, and, in fact, spread the trade into all parts of Italy. The fish not purchased by the merchants are salted and sold later in the season with other fish caught in the lagoons.

The guild of fish curers (*Ceto dei Fabbricatrio*) has existed time out of mind, and this industry has always been a monopoly of the inhabitants of Comacchio. Like all monopolies, it appears not to be free from abuses, and to require thorough reform. The eels are prepared for pickling by being first roasted on spits before a large fire, and then packed in barrels, which are filled up with vinegar. The *acquadelle* are fried in the fat of eels, and then packed in a similar manner. To salt the eels they are placed in layers in baskets of osier bands, each row being salted in order. The fish are next pressed under heavy weights, and the brine exudes through the interstices, afterwards they are packed in barrels.

Wild ducks and coots are plentiful in the lagoons, and form the object of an active trade with neighbouring provinces. The black heron, common heron, little egret, golden plover, &c., are likewise met with. As agriculture extends, hares, quails, woodcocks, and partridges become less numerous, and the preserves of Mesola, at

one time so rich in pheasants, hares, deer, and roebucks, have lost much of their former importance from over-shooting, and latterly, owing to the inundations of the Po, cantharides and leeches are also cultivated. The cantharides are imported from Sicily and the southern continental provinces; they feed on the leaves of the ash, and are caught at the end of May. In some years, the yield is so abundant as not only to supply local consumption, but to permit of a considerable exportation abroad. The leeches of the Ferrarese, which are considered of excellent quality, formerly formed an important article of commerce with France and other countries. To this industry, several families living near the lagoons owe their fortunes, but the excessive desire of gain has caused a diminution of the annual product.

MERCHANT SEAMEN (PAYMENT OF WAGES AND RATING) ACT, 1880.

[43 & 44 VICT., CH. 16.]

ARRANGEMENT OF SECTIONS.

CHAPTER 16.

An Act to amend the Law relating to the Payment of Wages and Rating of Merchant Seamen. [2nd August, 1880.]

Be it enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows; (that is to say),

1. *Short title and construction.*—This Act may be cited as the Merchant Seamen (Payment of Wages and Rating) Act, 1880.

This Act shall be construed as one with the Merchant Shipping Acts, 1854 to 1876, and those Acts and this Act may be cited collectively as the Merchant Shipping Acts, 1854 to 1880 (17 & 18 Vict., c. 104, &c.)

2. *Conditional advance-notes illegal.*—(1.) After the 1st day of August, 1881, any document authorizing or promising, or purporting to authorise or promise, the future payment of money on account of a seaman's wages conditionally on his going to sea from any port in the United Kingdom, and made before those wages have been earned, shall be void.

(2.) No money paid in satisfaction or in respect of any such document shall be deducted from a seaman's wages, and no person shall have any right of action, suit, or set-off against the seaman or his assignee in respect of any money so paid or purporting to have been so paid.

(3.) Nothing in this Section shall affect any allotment note made under the Merchant Shipping Act, 1854 (17 & 18 Vict., c. 104).

3. *Amendment of 17 & 18 Vict., c. 104, s. 169, as to allotment notes.*—(1.) Every agreement with a seaman which is required by the Merchant Shipping Act, 1854, to be made in the form sanctioned by the Board of Trade shall, if the seaman so require, stipulate for the allotment of any part not exceeding one-half of the wages of the seaman in favour of one or more of the persons mentioned in Section 169 of the Merchant Shipping Act, 1854 (17 & 18 Vict., c. 104), as amended by this Section.

(2.) The allotment may also be made in favour of a savings nk, and in that case shall be in favour of such persons and

carried into effect in such manner as may be for the time being directed by regulations of the Board of Trade, and Section 169 of the Merchant Shipping Act, 1854 (17 & 18 Vict., c. 104), shall be construed as if the said persons were named therein.

(3.) The sum received in pursuance of such allotment by a savings bank shall be paid out only on an application made, through a Superintendent of a Mercantile Marine Office or the Board of Trade, by the seaman himself, or, in case of death, by some person to whom the same might be paid under Section 199 of the Merchant Shipping Act, 1854 (17 & 18 Vict., c. 104).

(4.) A payment under an allotment note shall begin at the expiration of one month, or, if the allotment is in favour of a savings bank, of three months, from the date of the agreement, or at such later date as may be fixed by the agreement, and shall be paid at the expiration of every subsequent month, or of such other periods as may be fixed by the agreement, and shall be paid only in respect of wages earned before the date of payment.

(5.) For the purposes of this Section "savings bank" means a savings bank established under one of the Acts mentioned in the First Schedule to this Act.

4. *Rules as to payment of wages.*—In the case of foreign-going ships—

(1.) The owner or master of the ship shall pay to each seaman on account, at the time when he lawfully leaves the ship at the end of his engagement, £2, or one-fourth of the balance due to him, whichever is least; and shall pay him the remainder of his wages within two clear days (exclusive of any Sunday, fast day in Scotland, or bank holiday) after he so leaves the ship.

(2.) The master of the ship may deliver the account of wages mentioned in Section 171 of the Merchant Shipping Act, 1854 (17 & 18 Vict., c. 104), to the seaman himself at or before the time when he leaves the ship instead of delivering it to a Superintendent of a Mercantile Marine Office.

(3.) If the seaman consents, the final settlement of his wages may be left to the Superintendent of a Mercantile Marine Office, under regulations to be made by the Board of Trade, and the receipt of the Superintendent shall in that case operate as a release

by the seaman under Section 175 of the Merchant Shipping Act, 1854 (17 & 18 Vict., c. 104).

(4.) In the event of the seaman's wages or any part thereof not being paid or settled as in this Section mentioned, then, unless the delay is due to the act or default of the seaman, or to any reasonable dispute as to liability, or to any other cause not being the act or default of the owner or master, the seaman's wages shall continue to run and be payable until the time of the final settlement thereof.

(5.) Where a question as to wages is raised before the superintendent of a Mercantile Marine office between the master or owner of a ship, and a seaman or apprentice, if the amount in question does not exceed £5, the superintendent may adjudicate, and the decision of the superintendent in the matter shall be final; but if the superintendent is of opinion that the question is one which ought to be decided by a court of law he may refuse to decide it.

5. *Penalty for being on board ship without permission before seamen leave.* *See* 17 & 18 *Vict.*, c. 104, s. 237.—Where a ship is about to arrive, is arriving, or has arrived, at the end of her voyage, every person, not being in Her Majesty's service or not being duly authorised by law for the purpose, who—

(*a.*) Goes on board the ship, without the permission of the master, before the seamen lawfully leave the ship at the end of their engagement, or are discharged (whichever last happens); or

(*b.*) Being on board the ship, remains there after being warned to leave by the master, or by a police officer, or by any officer of the Board of Trade or of the Customs,

Shall for every such offence be liable, on summary conviction, to a fine not exceeding £20, or, at the discretion of the Court, to imprisonment for any term not exceeding six months; and the master of the ship or any officer of the Board of Trade may take him into custody, and deliver him up forthwith to a constable to be taken before a court or magistrate capable of taking cognizance of the offence, and dealt with according to law.

6. *Provisions contained in Section 5 to apply to ships belonging*

to foreign countries in certain cases.—Whenever it is made to appear to Her Majesty—

(1.) That the Government of any foreign country has provided that, unauthorised persons going on board of British ships which are about to arrive or have arrived within its territorial jurisdiction, shall be subject to provisions similar to the provisions contained in the last preceding section as applicable to persons going on board British ships at the end of their voyages; and

(2.) That the Government of such foreign country is desirous that the provisions of the said section shall apply to unauthorised persons going on board of ships belonging to such foreign country within the limits of British territorial jurisdiction;

Her Majesty may, by Order in Council, declare that the provisions of the said last preceding section shall apply to the ships of such country; and thereupon, so long as the Order remains in force, those provisions shall apply and have effect as if the ships of such country were British ships arriving, about to arrive, or which had arrived at the end of their voyage.

7. *Rating of seamen.*—A seaman shall not be entitled to the rating of A.B., that is to say, of an able-bodied seaman, unless he has served at sea for four years before the mast, but the employment of fishermen in registered decked fishing-vessels, shall only count as sea service up to the period of three years of such employment; and the rating of A.B. shall only be granted after at least one year's sea service in a trading-vessel, in addition to three or more years sea service on board of registered decked fishing-vessels.

Such service may be proved by certificates of discharge, by a certificate of service from the Registrar-General of Shipping and Seamen (which certificate the Registrar shall grant on payment of a fee not exceeding sixpence), and in which shall be specified whether the service was rendered in whole or in part, in steamship or in sailing ship, or by other satisfactory proof.

Nothing in this section shall affect a seaman who has been rated and has served as A.B. before the passing of this Act.

8. *Power of Court to rescind contract between owner or master,*

and seaman or apprentice.—Where a proceeding is instituted in or before any court in relation to any dispute between an owner or master of a ship and a seaman or apprentice to the sea service, arising out of or incidental to their relation as such, or is instituted for the purpose of this section, the Court, if, having regard to all the circumstances of the case, they think it just so to do, may rescind any contract between the owner or master and the seaman or apprentice, or any contract of apprenticeship, upon such terms as the Court may think just, and this power shall be in addition to any other jurisdiction which the Court can exercise independently of this section.

For the purpose of this section the term "Court" includes any magistrate or justice having jurisdiction in the matter to which the proceeding relates.

9. *Licensing of seamen's lodging-houses.*—It shall be lawful for the sanitary authority of any seaport town to pass bye-laws for the licensing of seamen's lodging-houses, for the periodical inspection of the same, for the granting to the persons to whom such licenses are given, the authority to designate their houses as seamen's licensed lodging-houses, and for prescribing the penalties for the breach of the provisions of the bye-laws: Provided always, that no such bye-laws shall take effect till they have received the approval of the Board of Trade.

10. *Desertion and absence without leave.*—The following provisions shall from the commencement of this Act have operation within the United Kingdom:—

A seaman or apprentice to the sea service shall not be liable to imprisonment for deserting or for neglecting or refusing without reasonable cause to join his ship or to proceed to sea in his ship, or for absence without leave at any time within twenty-four hours of his ship's sailing from port, or for absence at any time without leave and without sufficient reason from his ship or from his duty.

Whenever either at the commencement or during the progress of any voyage any seaman or apprentice neglects or refuses to join or deserts from or refuses to proceed to sea in any ship in which is duly engaged to serve, or is found otherwise absenting

himself therefrom without leave, the master or any mate, or the owner, ship's husband, or consignee may, with or without the assistance of the local police officers or constables, who are hereby directed to give the same, if required, convey him on board: Provided that if the seaman or apprentice so requires he shall first be taken before some Court capable of taking cognizance of the matters to be dealt with according to law; and that if it appears to the Court before which the case is brought that the seaman or apprentice has been conveyed on board or taken before the Court on improper or insufficient grounds, the master, mate, owner, ship's husband, or consignee, as the case may be, shall incur a penalty not exceeding £20, but such penalty, if inflicted, shall be a bar to any action for false imprisonment.

If a seaman or apprentice to the sea service intends to absent himself from his ship or his duty, he may give notice of his intention, either to the owner or to the master of the ship, not less than forty-eight hours before the time at which he ought to be on board his ship; and in the event of such notice being given the Court shall not exercise any of the powers conferred on it by Section 247 of the Merchant Shipping Act, 1854 (17 & 18 Vict., c. 104).

Subject to the foregoing provision of this Section, the powers conferred by Section 247 of the Merchant Shipping Act, 1854 (17 & 18 Vict., c. 104), may be exercised, notwithstanding the abolition of imprisonment for desertion and similar offences, and of apprehension without warrant.

Nothing in this Section shall affect Section 239 of the Merchant Shipping Act, 1854 (17 & 18 Vict., c. 104).

11. *Extension to seamen of* 38 *&* 39 *Vict., c.* 90.—The thirteenth section of the Employers and Workmen Act, 1875, shall be repealed in so far as it operates to exclude seamen and apprentices to the sea service from the said Act, and the said Act shall apply to seamen and apprentices to the sea service accordingly; but such repeal shall not, in the absence of any enactment to the contrary, extend to or affect any provision contained in any other Act of Parliament passed, or to be passed, whereby workman is defined by reference to the persons to whom the Employers and Workmen Act, 1875 (38 & 39 Vict., c. 90), applies.

12. *Repeal of enactments in Second Schedule.*—The enactments described in the Second Schedule to this Act shall be repealed as from the commencement of this Act within the United Kingdom.

Provided that this repeal shall not affect—

(1.) Anything duly done or suffered before the commencement of this Act under any enactment hereby repealed; or

(2.) Any right or privilege acquired or any liability incurred before the commencement of this Act, under any enactment hereby repealed; or

(3.) Any imprisonment, fine, or forfeiture, or other punishment incurred or to be incurred, in respect of any offence committed before the commencement of this Act, under any enactment hereby repealed; or

(4.) The institution or prosecution to its termination of any investigation or legal proceeding or any other remedy for prosecuting any such offence, or ascertaining, enforcing, or recovering any such liability, imprisonment, fine, forfeiture, or punishment as aforesaid, and any such investigation, legal proceeding, and remedy may be carried on as if this repeal had not been enacted.

SCHEDULES.

FIRST SCHEDULE.

Chapter.	Savings Banks.
24 & 25 Vict., c. 14.	Post Office Savings Banks.
26 & 27 Vict., c. 87.	Trustee Savings Banks.
17 & 18 Vict., c. 104, s. 180.	Seamen's Savings Banks.
19 & 20 Vict., c. 41.	

SECOND SCHEDULE.

(17 & 18 Vict., c. 104, in part.)

The Merchant Shipping Act, 1854,
in part: namely,

In Section 243, sub-Section (1), the words "to imprisonment for any period not exceeding twelve weeks with or without hard labour; and also."

In Section 243, sub-Section (2), the words "to imprisonment for any period not exceeding ten weeks with or without hard labour, and also at the discretion of the Court."

Section 246.

In Section 247, the words "instead of committing the offender to prison;"

And Section 248.

MERCHANT SHIPPING ACT (1854) AMENDMENT ACT, 1880.

CHAPTER 18.

An Act to amend the Merchant Shipping Act, 1854.

[2nd August, 1880.]

Whereas it is expedient to amend the Merchant Shipping Act, 1854 (17 & 18 Vict., c. 104).

Be it enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

1. *Short title.*—This Act may be cited as the Merchant Shipping Act (1854) Amendment Act, 1880.

2. *Amendment of s. 37 of 17 & 18 Vict., c. 104, as to numbers of joint owners of ships.*—Sub-section 2 of Section 37 of the recited Act is hereby repealed, and in place thereof it is enacted that the following words shall be deemed and be taken to be the second Sub-section of the 37th Section of the recited Act, and the recited Act shall be read and construed as if the second Sub-section of the 37th Section thereof had been originally expressed in the following words; videlicet,

Subject to the provisions with respect to joint owners or owners by transmission hereinafter contained, not more than sixty-four individuals shall be entitled to be registered at the same time as owners of any one ship; but this rule shall not affect the beneficial title of any number of persons of any company represented by or claiming under or through any registered owner or joint owner.

CORRESPONDENCE.

CURRENT BOTTLES.

To the Editor of the "Nautical Magazine."

SIR,—In reference to my letter in your April number the enclosed slip from the *New York Herald* about one of my current bottles will be of interest. On May 12th, Sunday, 1878, lat. 37° N., long. 28° W., I cast adrift from the *Hesperus* three bottles to test the currents and drift sweeping round the Sargasso Sea, and it was one of these that was picked up at Mobile Bay, Alabama Coast.

I find by my journal that a strong south-westerly breeze was blowing at the time. That its course was into the equatorial current, *viâ* the southerly set of the E. and main fork of the Gulf Stream and the Cape de Verdes, is certain; but it will be an interesting point for discussion whether or not in *this* case the ephemeral influences of subsequent north-westerly winds and consequent anti-cyclonic pressures gave it its first main direction. Having then joined the N. equatorial current, it will be interesting to follow it more closely on its cruise. It was evidently well clear of the drift into the Sargasso Sea, and in my opinion it either passed between the Cape de Verde Islands, made northing to the 20th parallel and passed with the currents between Hayti and Porto Rico or between the former and Cuba and north of Jamaica, and so into the Gulf of Mexico; or it may have passed south of the Cape de Verdes, and in that case would travel into the main equatorial current between the Windward and Leeward Islands into the current of the Caribbean Sea, south of Jamaica, and so through the Yucatan Channel. Once in the Gulf it would follow the current sweeping round it, and when in the neighbourhood of Mobile Bay would, now largely assisted by the south-westerly sea breezes that prevail in that region during May, be thrown off, as it were, towards the Bay, or it may have run with the south-easterly set east of the Mississippi mouths, and when off the west coast of Florida, where the currents become more variable, have been turned north-westerly by the S.E. winds of spring. Another

of my bottles cast off on April 30th, 1878, in lat. 13° 52′ N., long. 31° W., was picked up at Hayti and the paper forwarded to the Royal Geographical Society. No date was given when this last was found, but the letter of advice was dated 29th September, 1879.

Yours faithfully,
CLEMENT L. WRAGGE.

Farley, near Cheadle, July 19th, 1880.

"THE CRUISE OF A BOTTLE.—The bottle picked up on South Beach, near Fort Morgan, at the entrance of Mobile Bay, tells an interesting story of the winds and waves. This waif was thrown off the ship *Hesperus*, bound to London from South Australia, as she was just south of the Azores (about lat. 37° N. and long. 28° W.) on May 12, 1878, and was reported from the Alabama coast on the 22nd instant. It must, therefore, have been drifting a little over two years, which it has consumed in making the circuit of the equatorial Atlantic and the Mexican Gulf. The course pursued by this little 'tally put upon the winds' by Mr Wragge, a scientific voyager in the *Hesperus*, can be pretty accurately determined. During the month of May, 1878, when the bottle was committed to the sea, the barometric observations in the Atlantic demonstrated the prevalence of a large area of high pressure (30·20 inches) in the region south of the Azores and around its northern side, a strong band of westerly and north-westerly winds drawing in the anti-cyclonic direction. During the first 20 days of its voyage the bottle was under the pressure of these westerly and northerly winds and the consequent ocean current which they induced, so that its inevitable course was towards the island of Madeira and the Canaries, and thence south-westwardly off the Cape Verde into the north equatorial current. In 1843, Captain Becher, of the Royal Navy, charted a number of probable tracks pursued by bottles thrown out to test the rate of the equatorial currents, and the mean rate at which they travelled in this marine area was 10·6 miles per day. He found also that bottles thrown off into the north equatorial drift travelled much slower than those started from points nearer the equator and in the axis of the north-east trade

wind belt. Thus a bottle thrown over from the ship *Racehorse* in lat. 12° 12′, long. 65° 50′, April 17, 1836, was picked up, April 22, at Bonaire, having made 150 miles in five days. But a bottle thrown from the ship *Dunmore* in 1828, in lat. 27° 4′ and long. 28° on the north-eastern margin of the Sargasso Sea, reached Cuba, a distance of 3,200 miles, in 437 days, making on an average less than nine miles a day. The bottle from the *Hesperus*, just picked up on the Mexican Gulf coast, was approximately under the same wind and wave influences which bore the *Dunmore's* waif, and hence the former, traversing the equatorial current and passing through the Caribbean Sea into the Gulf of Mexico, making a total circuit of 5,500 miles, travelled at about the same mean rate—eight miles a day. This bottle cruise, performed unnoticed amid the trackless wastes of the equatorial seas, though no living soul can tell its vicissitudes and variations from day to day, declares the regularity of oceanic circulation; and its history will be highly prized by navigators and geographers.—*New York Herald*."

COMPASS CORRECTION.

To the Editor of the "Nautical Magazine."

Sir,—I have read your valuable journal since 1832, and received much information therefrom. Seeing a letter, whilst in Calcutta, therein by a Captain Smith respecting adjusting compasses with magnets, I send you mine on the opposite tack. I have been all my life connected with iron ships and steamers in both hemispheres, and more particularly one small steamer, the *Wm. Penn*, built in Mare's Yard, in Bow Creek; I assisted to take her out to the colonies, and was in her some time afterwards. I was afraid we should have a deal of trouble with the compasses, as the steering compass was eight points out, and would fix itself almost on any point it was placed; it was a very expensive spirit compass for the purpose of steadiness. I thought it too steady. I had a lighter one; it was as bad. The standard compass, about six feet from the deck, was six points out, and equally as sluggish, and appeared quite useless. I employed an adjuster in Bow Creek to magnets near to correct said errors. He placed about five

to the steering compass, and eight to the standard, which appeared to improve them. We went on the trial trip, and the moment the engines started so did the compasses, oscillating until we got in dock again, and were quite useless. I was recommended to another adjuster, and the first order he gave was to throw all the magnets overboard, or to any other place we liked.

When we were ready to leave the dock the adjuster went with us to Gravesend; he fixed some small pieces of soft iron in the compass bowls, which adjusted both compasses to within three degrees, the largest error, without detaining the vessel one minute, and the whole time I was in the ship those errors never varied with change of cargo; whether iron or wood they were the same. The adjuster told me it would be so, and I found it correct, he said those who think to correct a compass with permanent magnets only do so whilst the vessel is on the same spot, and at the same minute of time, for compasses adjusted by magnets to-day if adjusted again to-morrow in the same place, will vary in their errors, and, he added, that magnets were the greatest source of errors in compasses. I found that to be true. With these soft iron correctors properly placed, as in the *Wm. Penn*, although with the change of latitude they change in an opposite ratio, as the iron of the ship changes in its magnetic intensity, the compasses are correct, in all latitudes, with any kind of cargo, iron or otherwise. The compass by which I steered the *Wm. Penn* was an 8-inch card and was perfectly reliable and correct. I would warn my fellow captains never to allow a permanent magnet near the compass, and to adjust their own compasses with soft iron *themselves.*

C. COPPING,
Late Master s.s. *Wm. Penn*,
Melbourne, S. Australia.

Langham Hotel, 12th July, 1880.

[The statements made by our correspondent most of our readers will regard as somewhat remarkable. We should therefore much like to be favoured with the experience of compass adjusters and other shipmasters on the subject. It bears the signature of a shipmaster, otherwise we should have hesitated to publish it.—Ed. *N. M.*]

INSUFFICIENT CEILING.

To the Editor of the "Nautical Magazine."

SIR,—Having lately read several articles in your valuable Magazine about unseaworthy steamers and about the causes of their foundering, without seeing the cause of insufficient ceiling being mentioned, I beg to draw your attention to the fact, that nearly all steamers are built with a wooden ceiling from the keelson till about five feet above the wings. This ceiling is or ought to be perfectly water-tight. The pumps and sounding pipes go through this ceiling, and all water that comes between the ceiling and the vessel's side, as far as the ceiling goes, has admittance to the pumps. So far, this is all right, but if the vessel gets a leak above the ceiling, the water will find its way into the holds without ever getting to the pumps. Not even the sounding rod will show the water in the holds, and the vessel may be sunk without anyone knowing the real cause. This danger could easily be avoided by carrying the wooden ceiling from keelson to the main-deck.

When a vessel by grounding gets a leak in her bottom, the leak is often so heavy that the pumps are of little or no use, but if a vessel in open sea gets into collision with a wreck, ice, or similar objects, the pumps may be of the greatest importance, if the ceiling goes from keelson to main-deck, whereas they are now generally quite useless in such cases.

In my opinion a vessel is unseaworthy when the water has not free admittance to the pumps from any leak received in any part of the vessel, and I am convinced that many of the missing vessels have been lost through insufficient ceiling,

I am, Sir, your obedient servant,

L. H. CARL.

Copenhagen, 21st July, 1880.

"THE MERCURY TROUGH."

To the Editor of the "Nautical Magazine."

DEAR SIR,—The following may be of sufficient importance for a place in your Magazine. I am not aware whether it is generally known:—

I have been using for some time a mirror floating upon quicksilver, for the purpose of overcoming the mobility of the fluid, which prevents its being used in situations where there is any vibration. The mirror may be of black glass, or of any metal that will not be affected by the mercury, and of size to suit the trough which may be in use by the operator, but must be so much smaller than the trough as to allow it to float free of the sides. It should be carefully worked to parallel faces so as to maintain the horizontality of the fluid; but any error can be found and will be of course constant for a given mirror. Or the mirror may be marked on opposite sides, two observations taken, turning the marks alternately under the sun or other celestial object, the mean of the two observations giving the correct reading. Thus covering the quicksilver with a mirror renders the trough useful in many situations in which it would be otherwise useless to operate, and will be found useful in observatories in which vibration troubles the mercury trough.

Yours faithfully,

F. H. E.

Swatow, China, July 10th, 1880.

South Australia.—Notice to Mariners.—No 10 of 1880.—Pilotage.—Notice is hereby given, that the provisions of the Marine Board Acts 1860 to 1879, which relate to pilotage, are hereby extended by the Marine Board to the following ports in this Province, viz.:—Port MacDonnell, Port Beachport (Rivoli Bay), Port Victor, Port Wallaroo, Port Pirie, and Port Augusta; and that from and after the 10th day of June, 1880, if the master of any ship shall proceed to sea from any of the above-mentioned ports without receiving on board a qualified pilot to conduct the said ship, such master shall be liable to the provisions and penalties of Section 123 of the "Marine Board Act, 1860," and of all other sections of the said Act, and of all other Acts relating to the Regulation of Shipping and Pilots within the said province.—By Direction of the Board, Thos. N. Stephens, Secretary.—Marine Board Offices, Port Adelaide, 27th May, 1880.

BOOKS RECEIVED

Contributions to our Knowledge of the Meteorology of the Arctic Regions, Part II.; *and Meteorological Observations at Stations of the Second Order for the Year* 1878; published by the authority of the Meteorological Council. London: J. D. Potter, and E. Stanford.

The first of these works is an exceedingly interesting one, and is a continuation of another part—both devoted to the Arctic regions. The notes and abstracts from the journals are even more valuable than the weather statistics; they abound in shrewd suggestions,—and queries which time and fuller observations can alone answer. These answers we shall receive when the nations agree to place outlying meteorological stations on the confines of, and within, the Arctic circle.

The curious reader will doubtless be interested in the following extracts from the remarks—

"It was little more than a schoolboy's experiment to fire a ball of frozen mercury through an inch plank, but this had, possibly, not been done before."

"It is worthy of remark, be it explained as it may, if indeed it be a steady fact, which we do not yet know, that all the coldest days occurred near the time of full moon, and a little after, and that the temperature was highest immediately after the change."

"We froze oil of almonds in a shot mould at *minus* 40°, and fired it against a target, which it split, rebounding unbroken. A similar ball of ice had no effect."

April 25th—"A breeze made it very cold, though the thermometer was *plus* 6° in the day, and not more than *minus* 10° at night. It is probable that we were already beginning to find in our persons a new scale of agreeable temperature, though the extreme cold had not very long ceased. Physicians ought to explain these matters. Is it that the body generates more heat in cold weather, and the more as it is colder? If it did not, how could we be as warm at *minus* 50° as at *plus* 10° or 20°, putting out of the question all casualties from winds or exposure to them. But be this explained as it may, why does the body change its

standard, its opinion I may say, in such a manner? That which was not disagreeable a month since, was now intolerable; could a cold of *minus* 52° occur in July, with a day temperature of 70° *plus*, it is not easy to conceive what the feelings would be."

The second work consists of weather observations and statistics for every day of the year 1878, as determined at twenty-five stations in different parts of Great Britain and Ireland. It also includes monthly means and summaries, and finally gives the annual summary, showing on one page the mean values and totals of the year of the various meteorological elements, as well as the extreme temperatures and the maximum rainfall. The form in which the observations are published is that adopted for international use by the Meteorological Congress at Rome; so that the observations are comparable with those taken at stations of the first order at home and abroad.

Das Schwimmende Flottenmaterial der Seemächte. Von J. Fvon Kronenfels.—In vier Abtheilungen.—Erste Abtheilung.—Wien, Pest, Leipzig: A. Hartleben's Verlag. 1880.

This is the first part of what will be, when it is completed, a description of the war-ships, whether sea-going, coast defence, or despatch vessels, of all nations. Descriptions are given in detail of all the remarkable vessels, with admirable little woodcuts in the page, showing the area of armoured side, the arrangement of guns, &c., on the fighting decks, and, in some cases, sections of the ship, illustrating the details of her construction. The work is arranged alphabetically with regard to the nationality of the fleets. The part already published contains descriptions of the war-vessels of the Argentine Republic, Brazil, Chili, China, Denmark, and Germany (Deutschland).

More than half of this is, as might be expected, occupied by Germany. Perhaps the most interesting part is the detailed description of the two classes of vessels which appear in favour at present in the German Navy, and to which belong all the recent additions thereto. Previous to the Franco-German war they had only five ironclads, of which the largest, the *Konig Wilhhelm*, built in London in 1867, had 8 in. armour, her displace-

ment tonnage being 9,700. Five ironclads were added in 1873 and 1874, with armour from 8 in. to 10 in., and on a less tonnage, but in 1877 a fresh departure was taken in the design of four ironclads, which, on a displacement tonnage of 7,400 each, have armour of 16 in., made up of two plates, one 10 in. and the other 6 in. These vessels, known as the *Sachsen* class, are, both as regards armour and armament, far more formidable than any of their predecessors, although, like our *Inflexible*, the armour is restricted to a citadel amidships containing the machinery and armament. The six heavy Krupp guns, which constitute the latter, are carried, not in the turrets, but in fixed batteries, *en barbette*, and so arranged that four guns can fire right a-head, three on each broadside, and four right a-stern. These vessels are propelled by twin screws at an estimated speed of 14 knots, and are entirely dependent upon their engines, having a mast for signalling only. Another class of vessels which appear to find favour in the German Navy is that of iron-clad gunboats of 1,100 tons displacement. They have a belt of armour all round fore and aft, and a small armoured battery amidships mounting one large Krupp gun *en barbette*. Of these vessels, nine are launched and nine others will be finished by 1883. They are intended for coast defence purposes, and draw a little over ten feet. In the English Navy there are no vessels of anything like this type, and, indeed, the tendency with us has been of late years to build only ironclads which can carry very thick armour, and are, consequently, of large tonnage, and in war ships of smaller size to dispense with armour altogether, obtaining in its place speed sufficient to run away from an armoured enemy. The German iron-clad gunboats have only a speed of nine knots, but for all this they may be very useful for the work for which they are intended.

In the chapter on the Chinese Navy are given some interesting particulars of the gunboats built in England for China during the last few years, some of which carry upon a total displacement of only 400 tons a 38-ton gun.

If the parts to come, dealing with the more important maritime ations, are as full and complete as that before us, the whole work ll be of very great value to all who are interested in ironclads d war-ships generally.

TIDE TABLES FOR SEPTEMBER, 1880.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge.		Hull.		North Shields		Leith.		Devonport.		Dover.		Weston-Super-Mare.		Liverpool.		Greenock.		Queenstown.		Kingstown.		Londonderry.		Brest.	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
W	1	11 49	—	4 1	4 20	1 5	1 30	—	0 24	2 46	3 20	8 40	9 5	4 9	4 39	9 8	9 26	9 38	10 8	2 29	2 56	8 50	9 16	5 46	6 7	1 25	1 50
Th	2	0 16	0 41	4 53	5 13	1 52	2 12	0 47	1 7	3 48	4 12	9 29	9 49	5 6	5 29	9 47	10 5	10 27	10 46	3 20	3 40	9 40	9 59	6 27	6 45	2 13	2 30
F	3	1 2	1 21	5 31	5 48	2 30	2 47	1 25	1 42	4 31	4 55	10 8	10 26	5 49	6 8	10 22	10 38	11 5	11 23	3 59	4 17	10 16	10 31	7 3	7 21	2 47	3 3
S	4	1 40	1 58	6 5	6 22	3 2	3 17	1 59	2 15	5 14	5 33	10 44	11 2	6 27	6 45	10 54	11 11	11 41	11 59	4 34	4 51	10 46	11 1	7 38	7 55	3 20	3 37
S	5	2 18	2 28	6 39	6 56	3 33	3 49	2 31	2 47	5 52	6 9	11 20	11 39	7 3	7 20	11 28	11 45	—	0 16	5 8	5 25	11 17	11 33	8 11	8 26	3 54	4 11
M	6	2 45	3 0	7 13	7 30	4 5	4 22	3 2	3 18	6 26	6 43	11 58	—	7 37	7 53	—	0 2	0 33	0 51	5 42	6 0	11 49	—	8 41	8 55	4 28	4 44
Tu	7	3 16	3 34	7 47	8 4	4 39	4 57	3 35	3 52	6 59	7 15	0 17	0 36	8 10	8 27	0 19	0 36	1 9	1 27	6 18	6 36	0 7	0 25	9 11	9 28	5 0	5 17
W	8	3 53	4 10	8 22	8 40	5 15	5 34	4 10	4 29	7 32	7 50	0 55	1 14	8 44	9 1	0 54	1 12	1 45	2 3	6 54	7 13	0 44	1 3	9 45	10 3	5 35	5 53
Th	9	4 29	4 46	8 59	9 19	5 53	6 14	4 48	5 8	8 9	8 28	1 34	1 54	9 19	9 37	1 30	1 49	2 21	2 39	7 32	7 52	1 23	1 43	10 22	10 43	6 13	6 34
F	10	5 6	5 27	9 40	10 2	6 36	6 59	5 30	5 55	8 47	9 8	2 15	2 38	9 56	10 16	2 10	2 32	2 59	3 20	8 13	8 35	2 5	2 29	11 8	11 40	6 56	7 21
S	11	5 49	6 14	10 27	10 58	7 25	7 56	6 22	6 52	9 30	9 54	3 2	3 28	10 37	11 3	2 55	3 22	3 44	4 11	9 0	9 27	2 55	3 24	—	0 18	7 49	8 19
S	12	6 41	7 12	11 35	—	8 32	9 13	7 27	8 7	10 22	10 58	3 57	4 29	11 35	—	3 53	4 31	4 41	5 15	9 59	10 39	3 57	4 36	1 0	1 48	8 54	9 36
M	13	7 49	8 33	0 16	0 59	10 0	10 47	8 52	9 40	11 42	—	5 4	5 44	0 14	1 1	5 17	6 7	5 55	6 41	11 27	—	5 19	6 3	2 36	3 22	10 25	11 15
Tu	14	9 20	10 9	1 43	2 27	11 33	—	10 26	11 6	0 31	1 20	6 29	7 14	1 48	2 35	6 57	7 41	7 27	8 12	0 15	0 59	6 47	7 27	4 3	4 38	—	0 1
W	15	10 53	11 31	3 8	3 45	0 13	0 48	11 42	—	2 3	2 43	7 54	8 29	3 19	3 59	8 20	8 51	8 52	9 27	1 40	2 18	8 5	8 39	5 7	5 33	0 40	1 14
Th	16	—	0 5	4 17	4 44	1 18	1 43	0 12	0 37	3 20	3 51	8 58	9 25	4 33	5 3	9 17	9 41	9 56	10 22	2 49	3 16	9 9	9 36	5 58	6 22	1 42	2 7
F	17	0 32	0 57	5 8	5 29	2 6	2 27	1 1	1 24	4 17	4 41	9 48	10 10	5 29	5 53	10 2	10 23	10 45	11 7	3 39	4 1	9 57	10 16	6 44	7 5	2 28	2 48
S	18	1 20	1 42	5 50	6 11	2 46	3 5	1 44	2 4	5 4	5 25	10 32	10 53	6 15	6 37	10 43	11 3	11 29	11 50	4 22	4 43	10 35	10 58	7 26	7 46	3 8	3 28
S	19	2 1	2 20	6 31	6 50	3 24	3 43	2 23	2 41	5 45	6 5	11 14	11 35	6 57	7 16	11 22	11 41	—	0 10	5 3	5 22	11 11	11 29	8 4	8 21	3 47	4 6
M	20	2 37	2 56	7 9	7 28	4 1	4 19	2 58	3 15	6 24	6 41	11 55	—	7 34	7 52	—	noon	0 29	0 48	5 41	6 0	11 47	—	8 37	8 53	4 24	4 41
Tu	21	3 13	3 32	7 46	8 3	4 37	4 55	3 32	3 49	6 57	7 13	0 15	0 34	8 9	8 25	0 18	0 35	1 7	1 25	6 17	6 34	0 5	0 23	9 9	9 25	4 58	5 15
W	22	3 49	4 7	8 20	8 37	5 13	5 31	4 6	4 24	7 28	7 43	0 53	1 11	8 41	8 56	0 52	1 9	1 42	1 59	6 51	7 8	0 41	0 59	9 41	9 57	5 32	5 48
Th	23	4 24	4 41	8 54	9 11	5 48	6 6	4 42	5 0	7 58	8 12	1 28	1 45	9 10	9 25	1 25	1 41	2 15	2 31	7 21	7 40	1 17	1 35	10 14	10 32	6 5	6 22
F	24	4 56	5 14	9 28	9 46	6 24	6 43	5 19	5 39	8 27	8 42	2 8	2 22	9 40	9 56	1 58	2 16	2 47	3 5	7 57	8 15	1 53	2 13	10 53	11 19	6 40	7 1
S	25	5 33	5 53	10 7	10 31	7 5	7 30	6 1	6 25	8 59	9 19	2 42	3 3	10 13	10 32	2 36	2 57	3 24	3 46	8 35	8 57	2 34	2 57	11 49	—	7 23	7 46
S	26	6 15	6 40	10 59	11 32	7 57	8 28	6 52	7 23	9 41	10 7	3 25	3 50	10 55	11 27	3 20	3 48	4 9	4 34	9 22	9 53	3 23	3 58	0 22	0 59	8 13	8 47
M	27	7 7	7 41	—	0 10	9 6	9 50	8 0	8 43	10 38	11 16	4 20	4 55	—	0 6	4 25	5 7	5 6	5 46	10 30	11 11	4 30	5 10	1 43	2 28	9 27	10 9
Tu	28	8 19	9 8	0 48	1 27	10 31	11 11	9 26	10 5	—	noon	5 31	6 8	0 46	1 27	5 51	6 35	6 26	7 7	11 53	—	5 48	6 26	3 8	3 44	10 52	11 34
W	29	9 52	10 31	2 6	2 44	11 50	—	10 43	11 17	0 43	1 25	6 47	7 26	2 8	2 47	7 17	7 58	7 47	8 25	0 33	1 11	7 3	7 38	4 18	4 47	—	0 13
Th	30	11 6	11 37	3 18	3 48	0 24	0 52	11 45	—	2 5	2 40	7 59	8 25	3 23	3 54	8 23	8 48	8 56	9 23	1 45	2 14	8 8	8 35	5 10	5 31	0 44	1 10

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ add, − *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 3	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 3	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 3	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
rtlepool	+0 5	N. Shields
wich	−1 52	London
re	+6 4	Brest
oland	+0 21	Dover
head	−1 12	Liverpool
Island harbour	−0 53	N. Shields
lleur	+5 42	Brest
verness	−1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 13	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 43	London
Youghall	+0 13	Queenstown

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. Wm. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, *High Holborn, London, W.C.;* 6, *Lord Street, Liverpool; and* 10, *Erskine Street, Leicester.*

ENGLISH (APPLICATIONS).

2916. James Coutts and Henry Adamson, Liverpool. "Improvements in and relating to governing apparatus for marine engines."

2949. M. A. Thunsden, Kovigen, Arendal, Norway. "Improvements in the construction of ships' windlasses." (A communication.)

2952. Nicolas Frédéric Désiré Barbier, Paris. "Improvements in automatic luminous buoys."

2958. James Russell Neill, Glasgow. "A new or improved log or speed indicator for ships."

2977. Julius Frederick John Dahse, Gt. Tower Street, London. "A self-acting detachment for life-buoys."

3035. Jonathan Russell, Crosby Square, London. "An improved combined floating dock and lift."

3041. Charles Gumfrey Gumpel, Leicester Square, London. "Improvements in apparatus for producing and directing electric currents and for applying them to the steering of vessels."

3085. Charles George Lundborg, Helsingborg, Sweden. "Improvements in the hulls of ships or other vessels." (A communication.)

3089. John Day and George Day, Neath, Glamorgan. "Improvements in elevators or apparatus for raising or extracting water from mines, docks, or other places."

3092. Francis Nicol Baird and Ernest Gibson Baird, Glasgow, Lanark. "A new or improved anti-fouling composition for coating the bottoms of ships."

3111. Joseph Donovan, West Hartlepool. "Improvements in

the mode of, and apparatus for, supporting, raising, lowering, and disengaging ships' boats."

3163. Charles Frederick Osborne, Cape Town, South Africa. "A new or improved mode or means of propelling, steering, and manœuvring steamships or other such vessels, and improvements in the construction and arrangement of propellers and machinery or motive-power mechanism therefor."

3173. Thomas John Stevens, Odiham, Hants. "Improvements in the fittings employed in vessels for carrying cargo in bulk."

3189. James Robertson, Govan, Renfrew, N.B. "Improvements in, and connected with, screw-propellers for navigable vessels."

3250. Benjamin Berkley Hotchkiss, Paris. "Improvements in torpedo boats." (A communication.) (Complete specification.)

AMERICAN.

229000. Charles G. Kellogg, Brooklyn, New York. "A steam canal boat."

229270. Loftus Perkins, Gray's Inn Road, Middlesex. "A screw-propeller."

229507. Towner K. Webster, Chicago, Illinois. "A shipping can."

229570. Ezra W. Vanduzen, Newport. "A line stand for steamboat bells."

229833. Eleanor A. McMann, Cleveland, Ohio. "A safeguard for sleeping berths."

230079. Andrew J. Stevens, Sacramento, California. "A steering apparatus for vessels."

230160. Ferdinand Von Leicht, San Francisco, California. "A means of propelling ships."

230204. Richard Smith, Sherbrooke, Quebec, Canada. "A reciprocating propeller for vessels."

230215. Frederick Alsing, Copenhagen, Denmark. "Recording ship's compass."

230388. Will Adair, Canmer. "A folding shipping-coop."

CANADIAN.

11065. Albert L. Blackman, Nashville, Penn., U.S. "A vessel and machinery for aërial navigation."

VICTORIAN.

230388. Will Adair, Canmer. "A folding shipping-coop."

PATENTS PUBLISHED.

Propelling Vessels.

4733. November 20th, 1879. G. Wilson, Parliament Street, Westminster. Price 6d. This relates to a wheel enclosed in a casing and capable of being rotated by steam or other power, the parts of the apparatus being arranged so that there is a cavity or channel between the periphery of the wheel and the casing, extending partly but not completely round the wheel and communicating at one end with a supply pipe or conduit, and at the other end with an exit pipe or conduit.

Torpedo Boats.

4878. November 28th, 1879. John Louis Lay, Paris, France. Price 8d. (A communication.) This relates partly to providing a torpedo boat with a detachable magazine, which, on striking the object attacked, yields or moves backwards within the boat, and thereby decreases the buoyancy of the fore end of the same.

Torpedo Boats.

4291. December 2nd, 1879. James Donaldson, Engineer, Birkenhead, Cheshire. (Not proceeded with.) Price 2d. The invention consists in fixed girders, arched superstructures, or detachable trussed pole or poles may be used, being carried beyond the stern, forming a prolongation of the vessel above the water line, to which is attached mechanically or otherwise a solid or flexible shaft having at its outer end a screw-propeller attached, which, being carried beyond the disturbed water, gives to the boat an increased speed by working in solid water, not to be obtained when working in disturbed water close to the boat's hull, or subject to the bye-wash round turns of the stern.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
286	England—River Thames—Chapman and Mucking	Proposed alteration of lights.
287	„ Thames Entrance — Swin Middle	Proposed alteration of light.
288	„ South Coast—Needles Channel	Shoal ground and decreased depths.
289	„ East Coast—Lowestoft	Proposed alteration of low light.
290	„ „ Yarmouth District	Alteration of buoyage.
291	Scotland—East Coast—Peterhead	Temporary light and opening of South harbour.
292	„ „ Buckie (Cluny)	New harbour lights.
293	„ West Coast—Lamlash—Firth of Clyde	Additional light.
294	„ „ River Clyde — Roseneath Patch	Buoy lighted by gas in new position.
295	England — Bristol Channel — Flatholm and Avon	Proposed alteration of lights.
296	North Sea—Maas River—Brouwershaven Gat—Schouwen Bank	Position of bell beacon vessel.
297	„ Ems River—Borkum Flat	Altered position of light-vessel.
298	„ Jade River	New buoy lighted by gas.
299	„ Sylt Island—Munkmarsch	Intended alteration in colour of leading-light.
300	„ Lister Deep—Höyer	Do. do. do.
301	Baltic—Sweden—Off Oland Point	Discovery of shoal ground.
302	„ Prussia—Pillau	Two harbour lights now shown.
303	France—North Coast—Roscoff	New harbour light.
304	Portugal — West Coast — Tagus River Entrance	Colour of beacons in South channel.
305	Mediterranean — France — Marseille—Cape Janet	New sector in light.
306	„ Algeria—Gulf of Bona	Alteration in lights.
307	„ Italy—Genoa	Extension of breakwater.
308	„ „ Naples	Temporary light in mercantile port.
309	Red Sea—Suez Bay—Port Ibraham	New lights and buoy.
310	Africa—West Coast—Sherbro River	Buoys sunk and decreased depth.
311	India—West Coast—Cannanore	Alteration of light.
312	„ Bay of Bengal—Madras	Description of light on esplanade.
313	Gulf of Siam—Sunken Dangers	Description of, and buoyage.
314	China Sea—South Part—Pulo Sapatu	Reported danger.
315	„ Hainan Strait	Sunken rock eastward of strait.
316	Eastern Archipelago — Java — Batavia Road	Non-existence of danger eastward of Dapoer islet.
317	„ „ Madura Strait—Panarukan	New harbour light.
318	„ Philippine Islands—Luzon—Manila Bay—Corregidor	Alteration of light.
319	Japan—Kiusiu — Simabara Gulf — Fatsinotsu	New light.

MONTHLY ABSTRACT OF NAUTICAL NOTICES—*continued.*

No.	PLACE.	SUBJECT.
320	AUSTRALIA—East Coast—Look-Out Point	Discovery of bank.
321	„ „ Pioneer River	New leading lights.
322	NORTH AMERICA—West Coast—Vancouver Island—Esquimalt Harbour	Beacon on Dyke point.
323	WEST INDIES — Haïti — Port-au-Prince — Lamentin Point	Light revolving, not fixed.
324	CANADA—Nova Scotia—Gulf of Canso—Cape Canso	New automatic signal-buoy.
325	„ Gulf of St. Lawrence—Chaleur Bay—Shippigan	Light altered in position, and new leading lights.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

286.—ENGLAND.—*River Thames.—Sea Reach.—Alteration in the Character of the Chapman and Mucking Lights.*—During the month of January, 1881, the above-named lights will be made *occulting*. That at the Chapman will be under occultation *twice* in quick succession *every minute*, that is to say, it will suddenly disappear for three seconds, and then, as suddenly, reappear at full power for three seconds; again suddenly disappear for three seconds, and then reappear at full power for the remainder of the minute; and that at Mucking *once* in *every half-minute*, that is to say, it will, once in every half-minute, suddenly disappear for three seconds, and then, as suddenly, reappear at full power. Further notice will be issued.

287.—ENGLAND.—*Thames Entrance.—Swin Middle Light.*—In the month of November, 1880, the period of revolution of this light will be *altered* from a flash every minute to a *flash every half-minute.*

288.—ENGLAND.—*South Coast.—Needles Channel.*—(1.) *Shoal Ground Westward of Warden Ledge.*—Information relative to shoal ground recently found about 2 cables westward of Warden ledge, west coast of the Isle of Wight. This shoal ground now named *Warden Ledge bank*, is 3 cables long E.N.E. and W.S.W. (within the 5-fathoms line of soundings), and 1½ cable broad; it has a general depth of 23 to 30 feet, with the exception of a shoal spot of 20 feet situated near the north end of the bank, and from which

Warden point bears S.E. ¼ S.; Hurst high lighthouse, N.N.E. ¼ E.; and Warden ledge buoy, E. ½ N., distant 2 cables.

Caution.—The clearing mark, Sconce point open of Round Tower point, leads only a few yards outside the 20-feet patch. Vessels of heavy draught therefore should keep mid-channel between the N.E. Shingles buoy and Warden ledge buoy—taking care not to bring Needles lighthouse to bear westward of S.W. ¾ W., until the whole of Victoria fort on Sconce point opens clear of Round Tower point.

(2.) *Depths Decreased on Dolphin Bank.*—Shoaler ground has been found on the north-eastern part of this bank. This shoal ground, with a least depth of 15 feet, extends within the three-fathoms line in an E.S.E. and W.N.W. direction 8½ cables, and is about one cable in breadth; its eastern edge lies with Needles lighthouse bearing S.E. ¾ E., distant $1\frac{8}{10}$ mile, and S.W. Shingles buoy S.E. ½ E., distant one mile. *Variation*, 19° *W.*

289.—ENGLAND.—*East Coast.*—*Alteration in the Character of the Lowestoft Low Light.*—During the month of January, 1881, the *Low* light at Lowestoft will be made *occulting*, that is to say, it will, *once* in *every half-minute*, suddenly *disappear for three seconds*, and then, as suddenly, reappear at full power. Further notice will be issued.

290.—ENGLAND.—*East Coast.*—*Alteration of Buoyage in Yarmouth District.*—During the month of September, 1880, the following alterations and additions will be made to the buoyage of the Yarmouth district:—

(1.) *Covehithe Channel, and Barnard Sand.*—The Inner Barnard buoy will be moved 2½ cables S.W. by W. ½ W. The South Barnard buoy will be moved 4 cables S.W. ½ W. A Red Can buoy, to be called the S.E. Barnard, will be laid 5 cables N.E. ½ E. from the present position of the South Barnard buoy.

(2.) *Newcome Sand.*—The West Newcome buoy will be moved 1 cable W.N.W.

(3.) *Corton Sand.*—The South Corton buoy will be moved ¾ cable to the eastward.

(4.) *Scroby Sand.*—The S.W. Scroby will be moved 3 cables to the northward. The Scroby Elbow Bell buoy will be moved 2 cables N.N.E. ¾ E. The West Scroby will be moved 2½ cables

N.N.E. ¾ E. The Middle Scroby will be moved 2½ cables to the northward.

(5.) *The Cross Sands.*—The East Cross Sand buoy will be moved 2½ cables S.E. by S. A black conical buoy, with staff and cross, to be called N.E. Cross Sand buoy, will be laid 6 cables S. by W. ½ W. from the present position of the North Cross Sand buoy. The North Cross Sand buoy will be moved 1·7 mile N. by E. ¾ E. Masters of vessels are cautioned that considerable alterations have taken place in the Cross Sands since the last published survey, and it is dangerous to go to the westward of the buoys until within a short distance of the lightship.

(6.) *Newarp Light-ship.*—Owing to the above alterations in the Cross sands, the Newarp light will *not be moved* to the southward as advertized.

(7.) *Haisboro' Sand.*—The north Haisboro' buoy will be moved 5 cables N.W.

Further notice will be issued when these alterations and additions have been effected.

291.—SCOTLAND.—*East Coast.—Peterhead.— Temporary Re-Exhibition of South Harbour Light, and Opening of South Harbour.*—With reference to previous notice on the discontinuance of South harbour light, and closing of South harbour, Peterhead, the light at the entrance of Peterhead South harbour will be re-exhibited during the herring fishing season, until 15th September, 1880, when it will be discontinued. Also, Peterhead South harbour will be opened to shipping until 15th September, 1880, when it will be again closed.

Note.—The works of excavating and deepening the entrance to the harbour are still in progress, but a channel about 30 feet wide, and 4 feet in depth at low water has been formed, leading into the harbour basin; mariners must, however, use the utmost caution in approaching it.

292.—SCOTLAND.—*East Coast.—Harbour Lights at Buckie (Cluny).*—On and after 12th August, two *white* lights would be shown from the new harbour of Buckie; one situated on the outer end of the breakwater, the other on the rising ground behind. They form leading lights, bearing S.E. by S. ½ S., and clear

the West Muck by 160 yards. The outer light seen between E. ½ N. and W. ½ S. is visible 12 miles.

293.—SCOTLAND.—*West Coast.—Lamlash Lighthouse.—Holy Island, Near Arran, Firth of Clyde.—Additional Light.*—On and after 22nd September next, a *fixed red* light will be shown from the lower part of the tower of Lamlash lighthouse. The Lamlash light will then be recognised by mariners bound for Lamlash harbour of refuge, or passing up the Firth of Clyde, as a *double light*, showing a *fixed green* light *above* and a *fixed red* light *below*, on the same bearings as the existing light as seen from the ship, viz., about N.W. ¾ W. round by the West as far as the land will allow.

294.—SCOTLAND.—*West Coast.—River Clyde.—Alteration of Buoy on Roseneath Patch.*—The southern edge of this shoal is now marked by a black buoy, lighted by gas, moored W. ½ S., distant three-quarters of a cable from the position of the south-east buoy now removed.

295.—ENGLAND.—*Bristol Channel.—Alteration in the Character of the Flatholm and Avon Lights.*—During the month of January, 1881, the above-named lights will be made *occulting*. That at the Flatholm will be under occultation *twice* in quick succession *every minute*, that is to say, it will suddenly disappear for three seconds, and then, as suddenly, reappear at full power for three seconds; again suddenly disappear for three seconds, and reappear at full power for the remainder of the minute; and that at the Avon *once* in *every minute*, that is to say, it will, once in every minute, suddenly disappear for three seconds, and then, as suddenly, reappear at full power. Further notice will be issued.

296.—NORTH SEA.—*Maas River Entrance.—Brouwershaven Gat.—Position of Schouwen Bank Bell Beacon Vessel.*—With reference to previous notice on the reported existence of a shoal with 19 feet over it, said to lie N.E. by N. from Schouwen bank bell beacon vessel, distant 1½ mile, on examination it has been found that the most northern shoal carries a depth of 4 fathoms. From this shoal the lighthouse on Schouwen island, north-west extreme, bears about S.E. The beacon vessel has been moved about one mile west of its former position, and now lies on the east side of the most northern shoal on Schouwen bank. From the beacon

vessel, Westkapelle lighthouse bears S. by W., and Schouwen lighthouse S.E. ¼ E. Position as given, lat. 51° 47′ N., long. 3° 25′ E.

Note.—Vessels of heavy draught should pass north of the beacon vessel. *Variation*, 16½° *W.*

297.—NORTH SEA.—*Ems River.—Borkum Flat Light-Vessel.—Alteration in Position.*—With reference to Notice 185, p. 517, on the intended alteration in the position of Borkum flat light-vessel, this has been carried into effect. Position as given, lat. 53° 49′ 15″ N., long. 6° 17′ 5″ E. A red conical buoy lies in 15 fathoms water, 2 cables south of the light-vessel.

298.—NORTH SEA.—*Jade River.—Buoy Lighted by Gas.*—A black buoy, lighted by gas and marked *Jade* in white letters on two sides, has been placed in 6¼ fathoms at the entrance to Jade river. From this buoy (which exhibits a *green* light at an elevation of 15 feet above the sea), Wangeroog lighthouse appears in line with Wangeroog beacon; Wangeroog church tower bears S. 60° W., and Wangeroog lighthouse bears S. 21° W. The automatic signal-buoy at the entrance to Jade river has been removed.

299.—NORTH SEA.—*Sylt Island.—Alteration in Colour of Leading Light at Munkmarsch.*—It is intended to alter the colour of the southern leading light at Munkmarsch, Sylt island, from *white* to *red*.

300.—NORTH SEA.—*Lister Deep.—Alteration in Colour of Leading Light at Höyer.*—It is intended to alter the colour of the north-western leading light at Höyer head, of Höyer deep, from *white* to *red*.

301.—BALTIC.—*Sweden.—Oland Island.—Shoal Ground South-Eastward of Oland Point.*—About 12 miles south-eastward of Oland point, south extreme of Oland island; this shoal ground (*Oland süd grund*), about half-a-mile in extent, with a depth of 5¼ fathoms over it, and 6 to 9 fathoms around, lies with the following bearings, viz.:—Södra Udde lighthouse, Oland island, N.W. ½ N.; Utklippor rocks lighthouse W. ⅛ S. *Variation*, 9° *W.*

302.—BALTIC.—*Prussia.—Harbour Lights at Pillau.*—Two lights are now exhibited from the western part of the outer harbour mole, in course of construction at Pillau; they are placed vertically—the upper light *white*, the lower light *red*—and are

shown (weather permitting) as long as the Frische Haff is navigable for sailing vessels.

303.—FRANCE.—*North Coast.—Harbour Light at Roscoff.*—Exhibited from an iron standard, recently erected on the extreme end of the mole, Roscoff harbour; it is a *fixed white light*, elevated 22 feet above high water (20 feet above the ground), and visible from a distance of 7 miles. Position, lat. 48° 43′ 30″ N., long. 3° 58′ 50″ W.

304.—PORTUGAL.—*West Coast.—Tagus River Entrance.—Colour of Beacons for South Channel.*—With reference to previous notice respecting the erection of three beacons to facilitate the navigation of the South channel, Tagus river entrance, the beacons are coloured red and white in bands.

305.—MEDITERRANEAN.—*France.—Marseille.—Green Sector of Light on Cape Janet.*—With reference to previous notice on the establishment of a fixed and flashing light on cape Janet, northern side of entrance to the new harbours of Marseille, a sector of *green* light is now shown from cape Janet lighthouse, through an arc of 14½°, between the bearings of N. 39¼° E., and N. 53¾° E. The southern limit of this sector (visible from a distance of 8 miles) passes 219 yards north of the extremity of the jetty on western side of North Outer port.

Note.—The *red flashes* exhibited from cape Janet lighthouse are considerably weakened in brilliancy. When certain of being north of Ratoneau and Pomègues islands, vessels may keep within either the white or green sectors of cape Janet light.

306.—MEDITERRANEAN.—*Algeria.—Gulf of Bona.—Alteration in Lights at Port Bona.*—The fixed white light exhibited from Lion point, north-eastward of port Bona, has been discontinued, and the fixed red light formerly exhibited from the extremity of the northern mole is replaced by a light shown from an iron tower 56 feet high erected in the immediate vicinity. This light is *fixed white*, elevated 63 feet above the sea, and visible from a distance of 14 miles. Position on chart, lat. 36° 54′ 10″ N., long. 7° 47′ 0″ E.

307.—MEDITERRANEAN.—*Italy.—Extension of Breakwater Works at Genoa.*—With reference to previous notice on the extension of [bre]akwater works at Genoa, which works were said to extend in

a south (*true*) direction from the New or West mole head, the works commence from a position 150 yards westward of the head of the said mole, and the extremity of this southerly extension of the breakwater is marked by a buoy painted black. Also, the construction of the *second* arm of the New or Western mole being about to be commenced, a buoy has been placed to mark its outer extremity. The buoy lies with the following bearings:—Centre of Cava battery, N. 58° E.; Cape St. Benigno (cape Ferro) light-house, N. 41° W.; Black buoy marking extremity of first arm, N. 48° W. Mariners are warned in entering or leaving the port to pass eastward of the new buoy. *Variation*, 13° *W*.

308.—MEDITERRANEAN.—*Italy.—Gulf of Naples.—Temporary Green Light in Mercantile Port of Naples.*—During repairs which are being effected at the mole head of San Gennaro, south side of the old mercantile port of Naples (Grand port), a light will be exhibited from a small wooden tower, erected about 65 yards sea-ward of the extremity of the mole. The light is *fixed green*, elevated 19 feet above the sea, and visible from a distance of 2 miles.

Note.—Vessels, when entering or leaving Grand port, should pass northward of this light.

309.—RED SEA.—*Gulf of Suez.—Suez Bay.—Lights at Port Ibraham.*—The following undermentioned lights are now exhibited. (1.) Two floating lights 897 yards seaward of the entrance of the harbour—*green* on the northern side of the channel, *red* on the southern side. (2.) A *fixed green* light on the extremity of the north mole head; a *fixed red* light on the extremity of the south mole head. (3.) A *fixed white* light on the extreme (western) end of the inner pier of the harbour.

Note.—These green and red lights mark the channel into the port; entering port Ibraham, the green lights are left on the port-hand, the red lights on the starboard-hand, the vessel being steered for the white light on the inner pier. It is also *intended* when the state of the sea prevents the exhibition of the floating lights, to show two lights, *green* and *red* placed vertically, from the eastern commencement of the inner pier. These lights kept in line with the white light at the extreme (or western) end of the pier will then indicate the channel. Also, a *buoy* has been placed on each

side of the channel to port Ibraham, 568 yards from the mole heads—the northern buoy in a line with the green lights, the southern buoy in a line with the red lights.

310.—AFRICA.—*West Coast.—Buoyage and Depth in Sherbro River.*—The buoys marking the positions of several shoals in this river have all sunk, and, in the opinion of experienced local pilots, no vessel drawing more than 18 feet water can ascend the river with safety.

311.—INDIA.—*West Coast.—Alterations in Cannanore Light.*—The *red* light formerly exhibited from the flagstaff at Cannanore is now shown from a stone structure erected on the ramparts of the fort, near the flagstaff. The light (*fixed red*) is elevated 64 feet above the level of the sea, and is visible from a distance of 6 miles.

312.—INDIA.—*Bay of Bengal.—Madras—Description of Light on Esplanade.*—The flashes and eclipses are irregular in duration, but the proportion of light to darkness is as 2 to 3.

313.—GULF OF SIAM.—*Sunken Dangers.*—The following dangers have been discovered and recently *marked by beacon buoys*:—

(1.) *Henry Rock.*—A large iron beacon buoy (painted in black and white stripes, horizontally) has been moored in 5 fathoms water south of a reef in the fairway of Chong Samit (the channel between Koh Samit and the mainland). At very low tides this rock shows above water; it extends about 240 feet East to West, and 160 feet North to South; and bears from the south point of Koh Samit N.W. ¾ W., and from Lem Yah W. by S. ¼ S. Approximate position of rock, lat 12° 34′ 20″ N., long. 101° 22′ E.

(2.) *Hin Hi Chee Reef.*—A large beacon buoy painted red has been moored on the north side of a reef of rocks which extends from East to West about 180 feet and from North to South about 280 feet. There are three peaks which show about 3 feet above water at low spring tides in the month of March, and bear from the middle of the island of Koh Tulu N. ½ W., and from the island of Koh Kai E. ¼ S. Approximate position of reef, lat. 12° 34′ 30″ N., long. 101° 33′ E.

(3.) *Jessen Reef.*—A large beacon buoy painted black has been moored in 16 fathoms water, sandy bottom, at right angles from two reefs of rock. To the south of the reefs these two reefs bear

from each other N.E. and S.W. about 4 cables, with a depth of water between them of 16 fathoms, sandy bottom. The eastern reef is about 120 feet long and 50 feet broad, least water found on it 9 feet, 2 feet from this, soundings gave 8 fathoms. The western reef is about 80 feet long and 50 feet broad, least depth 7 feet; at low tides in the month of March this reef will show above water. The eastern reef bears from the centre of the island of Koh Man, S. ½ W. 9½ miles, and from the island of Koh Tulu, S.E. ¾ S. 10½ miles. These two reefs are very dangerous for ships approaching the coast in the night. During the day the buoy will be visible 5 miles. Approximate position of reef, lat. 12° 25′ N., long. 101° 39′ E.

(4.) *Reported danger.*—A sandbank is said to lie in lat. 6° 16′ N., long. 102° 32′ E.

314.—China Sea.—*South Part.—Reported Danger Southward of Pulo Sapatu.*—This sunken danger lies close to the usual track of vessels from Singapore to Hong Kong; its northern extremity is said to have been passed by the French ship *Veteran* at a distance of a quarter of a mile, and reported to lie S.S.E. of Pulo Sapatu, distant 13 miles. The breakers were observed to extend for a mile in a N.N.E. and S.S.W. direction. Position approximate, lat. 9° 45′ N., long. 109° 11′ E.

315.—China Sea.—*Sunk Rock Eastward of Hainan Strait.*—The commander of the French mail-packet *Oxus*, M. Rapatel, reports having recently seen a rock in lat. 20° 9′ N., long. 111° 56′ E. It is further stated that this rock had been seen in 1878 by the English steam-vessel *Minerva* in the same position, and that her master, Captain Peacock, had passed it within the distance of 1¼ mile, that the sea broke on it, and that for about one mile around the water was disturbed and appeared of a greenish colour. The position is 67 miles E. ⅛ S. from Hainan head, and near the fairway of approach to Hainan strait from Hong Kong. *Variation*, 1° *E.*

316.—Eastern Archipelago.—*Java.—Batavia Road.—Reported Danger Eastward of Dapoer Islet.*—With reference to Notice 161, p. 425, on the reported existence of a sunken danger lying E. by S. ¼ S. 1$\frac{6}{10}$ths mile from Dapoer islet, approach to Batavia road,

on close examination of the locality, it has been found that the above-mentioned danger *does not exist.*

317.—EASTERN ARCHIPELAGO.—*Java.—Madura Strait.—Harbour Light at Panarukan.*—It is a *fixed white* light elevated 48 feet above the sea, and visible from a distance of 8 miles; it is shown from an iron support, which, with an iron watch-house, stand on a stone pedestal near the landing place. Position, lat. 7° 42′ 40″ S., long. 113° 56′ 40″ E.

318.—EASTERN ARCHIPELAGO.—*Philippine Islands.—Luzon.—Manila Bay.—Alteration in the Light of Corregidor Island.*—This light instead of performing one revolution with flashes every 30 seconds, now completes the revolution *every fifteen seconds*, as a mean period; the intervals between the revolutions varying from ten to twenty seconds.

319.—JAPAN.—*Kiusiu.—West Coast.—Simabara Gulf.—Light at Futsinotsu.*—With reference to Notice 207, p. 523, on the intended exhibition of a light at Futsinotsu (Kutchinotsu), the light is now exhibited from a lighthouse erected on the western entrance point of Futsinotsu harbour, south side of Simabara gulf. It is a *fixed white* light, visible through an arc of 248°, from the bearing of E.N.E. round to south; elevated 126 feet above the sea, and should be seen from a distance of 8 miles. The tower is 16 feet high, built of brick, and painted white. Position, lat. 32° 36′ 17″ N., long. 130° 12′ 20″ E.

320.—AUSTRALIA.—*East Coast.—Bank North-West of Look-out Point.*—This bank, on which the *Decapolis* grounded, 30th August, 1879, is stated by the master, Mr. Almond, to be apparently of flat surface composed of clay and sand, with a least depth over it of 2¼ fathoms (one cable W.N.W. of the vessel when aground), deepening quickly seaward to 7 and 9 fathoms, and may be an extension of the shoal ground extending from Look-out Point. The following bearings were taken from the ship on the bank, in 2½ fathoms—tide half flood:—Cape Flattery open a quarter of a point of Look-out Point, S.E.; Remarkable sand patch, S.S.W. These bearings place the bank 3 miles distant from Look-out point. Position approximate, lat. 14° 47¼′ S., long. 145° 14′ E. *Variation, 6° E.*

321.—AUSTRALIA. — *East Coast.* — *Pioneer River.* — *Leading Lights.*—Four pairs of leading lights have been established, which lead up the circuitous channel of Pioneer river from seaward, until within sight of the town.

322.—NORTH AMERICA.—*West Coast.*—*Vancouver Island.*—*Esquimalt Harbour.*—*Beacon on Dyke Point.*—A beacon has been erected on Dyke point, as the leading mark for Esquimalt harbour, in lieu of Thetis cottage, which has been removed. The beacon, 23 feet above high water, is pyramidal in shape, constructed of wood and painted white.

Note.—Dyke point beacon just open of, or in line with the Western Inskip rock, bearing N. by W. ¼ W., leads in mid-channel to Esquimalt harbour. *Variation*, 22½° *E.*

323. — WEST INDIES. — *Haiti.* — *Port-au-Prince.* — *Light at Lamentin Point.*—With reference to Notice 282, p. 705; on the exhibition of a fixed and flashing light at Lamentin point, south shore of Port-au-Prince, it is a *revolving light* with *red* flashes every *thirty seconds*, and not a fixed red light varied by red flashes.

324.—CANADA. — *Nova Scotia.* — *Gut of Canso.* — *Automatic Signal Buoy off Cape Canso.*—The buoy, painted black, marked *Cape Canso*, and sounding a ten-inch whistle, is moored in 20 fathoms water, 1½ mile E.S.E. of Grime rock; it will be kept in position during the season of navigation each year. Position, lat. 45° 21′ 15″ N., long. 60° 50′ 25″ W. The Bell buoy previously moored off Grime rock has been withdrawn, and a *Spar* buoy, painted black, has been placed on the east side of the rock in 7 fathoms water.

325.—CANADA.—*Gulf of St. Lawrence.*—*Chaleur Bay.*—*Alteration in Position of Shippigan Light and Establishment of Leading Lights.*—The light (*fixed white*) formerly exhibited from Taylor island, west side of entrance to Shippigan gully, has been removed to Alexander point, the east entrance point. Also, a small light, consisting of a lantern hoisted on a pole, has been established at 484 feet S.W. by W. from the main light. This light (*fixed white*) is elevated 22 feet above high water, and is visible from a distance of 9 miles, when bearing N.E. by E.

Note.—These lights when in line, lead up to a buoy which has been placed outside the bar at the entrance to Shippigan gully.

OUR OFFICIAL LOG.

Official Inquiries at Home, 1880.

654. *American*, s.s.; built at Dundee, 1873; owned by the Union Steamship Company; tonnage, 1,598; Southampton to Cape Town; passengers and general cargo; abandoned at sea, April 28, 1880. Inquiry held at Westminster, July 2, 1880, before Rothery, Wreck Commissioner; Castle and Vaux, N.A.; Ravenhill, E.A. Casualty caused by the breaking of the shaft in the stern tube, and from the side of the ship having been pierced. No blame attached to master; on the contrary, his conduct, as well as that of officers and crew, in their efforts to save vessel and passengers, was admirable.

656. *Rosland*, barque; built at Southwick, Durham, 1870; owned by J. Davies and others; tonnage, 240; Buenos Ayres to Queenstown; tallow, &c.; stranded at Canavan's Point, Queenstown Harbour, June 3rd, 1880. Inquiry held at Liverpool, July 2, 1880, before Raffles, Stip. Mag.; Wilson and French, N.A. Accident due to negligent navigation on the part of the master. Certificate suspended for three months.

659. *Francis Drake*, brigantine; built at Prince Edward's Island, 1863; owned by Mr. F. D. Keslake and others, of Torquay; Trinidad to Falmouth; sugar; lost on the West Coast of Jutland, May 21, 1880. Inquiry held at Westminster, July 5, 1880, before Rothery, Wreck Commissioner; Parfitt and Anderson, N.A. Vessel not navigated with seamanlike care and skill. Master's certificate suspended for twelve months. Recommended for one as mate during that time.

660. *Mary Driver*, s.s.; built at Stockton, 1871; owned by Mr. J. Richardson; tonnage, 869; Alexandria to Gibraltar; wheat in bulk; lost near Cape Blanco, Tunis, May 4, 1880, when loss of life ensued. Inquiry held at Hull, July 2, 1880, before Twiss, Stip. Mag.; White, Ward, and Beasley, N.A. Loss attributable to too southerly a course having been steered from the Cain Rocks. Mate committed an error of judgment; master

having lost his life, Court refrained from expressing any opinion as to his conduct.

662. *Maglona*, s.s.; built at North Shields, 1871; owned by Earl Vane; tonnage, 472; Rotterdam to Seaham; ballast; stranded on Hawthorne Hythe, June 21, 1880. Inquiry held at Sunderland, July 8, 1880, before Booth and Featherstonhaugh, Judges; Hight and Curling, N.A. Master in default; ordered to pay £5 towards expenses of inquiry. Certificate not dealt with.

664. *Evangeline*, ship; built at Liverpool, 1873; owned by Mr. J. S. De Wolf; tonnage, 994; Liverpool to Philadelphia; pig iron; abandoned at sea, April 19, 1880. Inquiry held at Liverpool, July 9, 1880, before Raffles, Stip. Mag.; Ward and Wilson, N.A. Abandonment justifiable.

666. *Kildonan*, brigantine; built at River John, Nova Scotia, 1876; owned by Gordon, of Picton, N.S. and others; tonnage, 371; Barrow-in-Furness to New York; pig iron; abandoned at sea, May 24, 1880. Inquiry held at Liverpool, July 12, 1880, before Raffles, Stip. Mag.; Ward and Wilson, N.A. Abandonment not justifiable, the vessel having been subsequently brought into port. Master not before the Court.

667. *Joseph Pease*, s.s.; built at Stockton, 1876; owned by Mr. James Dixon and others; tonnage, 1,170; New York to Marseilles; grain in bulk; supposed to have foundered at sea. Inquiry held at Westminster, July 9, 1880, before Rothery, Wreck Commissioner; Aplin and Beasley, N.A.; Merrifield, E.A. Court found that the vessel's loss was probably due to her want of stability.

668. *Telford*, s.s.; built at Willington Quay, 1877; owned by Mr. J. Wait and others; tonnage, 1,130; New York to Antwerp; grain in bulk; supposed to have foundered at sea. Inquiry held at Westminster, July 10, 1880, before Rothery, Wreck Commissioner; Castle and Clarke, N.A.; Merrifield, E.A. Loss probably due to the failure of her crank shaft, and to the cargo having shifted in consequence of the insufficiency of her shifting boards.

669. *H. D. Bills*, barquentine; built at Boston, U.S., 1862; owned by Mr. D. Jones and others, of Chepstow; tonnage, 574; Liverpool to Wilmington; salt and ballast; supposed to have foundered at sea. Inquiry held at Liverpool, July 14, 1880,

before Mansfield, Judge; White and French, N.A. Vessel left port in good and seaworthy condition. No evidence to show from what cause the vessel was lost.

673. *Knowsley Hall*, ship; built at Liverpool, 1873; owned by Mr. Wm. Herron and others; tonnage, 1,773; London to New Zealand; general cargo and passengers; supposed to have foundered at sea. Vessel left London in good and seaworthy condition. Nothing to show from what cause she was lost.

674. *R. L. Alston*, s.s.; built at Stockton, 1868; owned by Mr. G. N. Wilkinson, of London; tonnage, 452; South Shields to the Gulf of Obi, Siberia; general cargo; stranded at the entrance Yugorski Straits, Arctic Ocean, August 8, 1879. Inquiry held at Westminster, July 13, 1880, before Rothery, Wreck Commissioner; Pickard, Parfitt, and Wilson, N.A. Stranding due to the vessel having been kept too close to the land. Master since dead.

677. *Jessie Boyle*, barque; built at St. John's, N.B., 1854; owned by Mr. P. Rawle and others; tonnage, 719; Newport to Pensacola; railway iron; lost on Point Holandés, May 11, 1880. Inquiry held at Cardiff, July 14, 1880, before Jones, Stip. Mag.; Anderson and Clarke, N.A. Loss due to the master having steered improper courses. Certificate suspended for two months.

678. *Topaz*, s.s.; built at Dumbarton, 1866; owned by J. and J. Hay, of Glasgow; tonnage, 39; Bowling to Belfast; coals; lost, through bursting of the boiler, near Sanda, June 11, 1880, when the master was drowned. Inquiry held at Glasgow, July 15, 1880, before Jamieson and Reid, J.P.; May and Murdoch, N.A. No evidence before the Court as to cause of explosion.

680. *Senegal*, s.s.; built at Port Glasgow, 1872; owned by the British and African Steam Navigation Company; tonnage, 1,047; Old Calabar to Madeira and Liverpool; palm oil, &c.; stranded off Gando Point, Grand Canary, May 12, 1880, when loss of life ensued. Inquiry held at Liverpool, July 21, 1880, before Mansfield, Judge; White, Wilson, and French, N.A. Master and chief officer to blame; the former censured and the certificate of the latter suspended for three months.

681. *Cerwyn*, s.s.; built at South Shields, 1873; owned by Mr. E. Handcock and others, of Falmouth; tonnage, 206; Bilbao to Newport; iron ore; lost on the Saint's Rocks, March 24, 1880, when loss of life ensued. Re-hearing of Inquiry held at Westminster, July 19, 1880, before Rothery, Wreck Commissioner; Powell, Forster, and Vaux, N.A. Casualty due to careless and improper navigation on the part of the master, whose certificate was not dealt with, the Court not being requested to do so by the Board of Trade.

682. *Ilen*, s.s.; built at Cork, 1873; owned by Mr. Jas. Casey; tonnage, 138; Littlehampton to Jersey; water ballast; lost on Cape La Hague, June 18, 1880. Inquiry held at Westminster, July 20, 1880, before Rothery, Wreck Commissioner; Curling and Vaux, N.A. Master in default for not sufficiently reducing the speed of his vessel in thick weather. Certificate suspended for three months.

685. *Quito*, barque; built at Sunderland, 1850; owned by Mr. W. Cliff and others; tonnage, 503; Montego Bay to United Kingdom; rum, sugar, &c.; supposed to have foundered at sea. Inquiry held at Liverpool, July 23, 1880, before Mansfield, Judge; White and French, N.A. No evidence before the Court as to the cause of loss.

687. *Whittington*, ship; built at Lancaster, 1866; owned by the Lancaster Shipowners' Company; tonnage, 969; Philadelphia to United Kingdom; grain in bulk; supposed to have foundered at sea. Inquiry held at Westminster, July 24, 1880, before Rothery, Wreck Commissioner; Powell and Harland, N.A.; Merrifield, E.A. No evidence to show cause of loss.

688. *Rock Light;* built at Bath, State of Maine, 1854; owned by Mr. W. Herron of Liverpool; tonnage, 1,643; Philadelphia to Bristol; grain and oil cake; supposed to have foundered at sea. Inquiry held at Westminster July 24, 1880, before Rothery, Wreck Commissioner; Pickard and Comyn, N.A.; Merrifield, E.A. Loss probably due to the extremely tempestuous weather which prevailed in the Atlantic during the months of November and December last.

689. *Rathmore*, s.s.; built at Sunderland, 1878; owned by the St. Andrew's Steamship Company; tonnage, 1,382; Cardiff

to Bombay; coals; supposed to have foundered at sea. Inquiry held at Westminster, July 23, 1880, before Rothery, Wreck Commissioner; Forster and Curling, N.A.; Merrifield, E.A. Vessel in good order and condition when leaving port, but some doubt was expressed as to her having sufficient stability for a winter voyage across the Bay of Biscay. No evidence as to cause of loss.

693. *Essex*, ship; built at Sunderland, 1863; owned by Messrs. Marshall & Co.; tonnage, 1,255; Bassein to Queenstown; rice; supposed to have foundered at sea. Inquiry held at Westminster, July 31, 1880, before Rothery, Wreck Commissioner; Forster and Castle, N.A. Court found that the vessel was too deeply laden, and to this cause attributed her loss.

Official Inquiries Abroad.

655. *Clyde*, s.s.; stranded in the Wairoa River, February 20, 1880. Inquiry held at Clyde, Wairoa, N.Z., March 3, 1880. Accident occasioned by a heavy sea striking the vessel on the port-side. Master free from blame.

657. *Sea Bird*, ketch; foundered off Bird Island. Inquiry held at Sydney, May 10, 1880. Casualty due to a heavy squall in which the vessel capsized. Master free from blame.

658. *Lady Emma*, brig; lost on the North Head, Port Jackson. Inquiry held at Sydney, May 10, 1880. Master in default, through being stupefied from the effects of drink. He was drowned, having refused to leave the vessel. Mate reprimanded.

661. *Richard Pearse*, schooner, and *Forerunner*, steam-tug; both stranded whilst entering Durban, March 10, 1880. Inquiry held at Durban. Accident unavoidable and attributable to the narrowness of the channel, and to the schooner being struck by two or three heavy seas on her broadside.

663. *Edmonton*, s.s.; lost on Gingerbread Ground, Great Bahama Bank, May 30, 1880. Inquiry held at Nassau, June 10, 1880. Loss due to a strong south-easterly current. No blame attached to master.

665. *Kangaroo*, s.s.; stranded off Bird Island, May 6, 1880. Inquiry held by Marine Board of South Australia. Accident due to chief officer altering the course unknown to master.

670. *Andean*, s.s.; stranded on Maugre Cay Reef, June 5, 1880. Inquiry held at Belize, June 16, 1880. Master in default for negligent navigation. Certificate suspended for six months.

671. *Margot*, brig; lost near Sambawa, January 9, 1880. Inquiry held by the Mauritius Marine Board, April 15, 1880. Casualty due to a severe gale of wind. Master and chief mate free from blame, the latter deserving much credit for his conduct.

672. *Duchess of Lancaster*, ship; stranded on Weymouth Reef, Island of Antigua, May 31, 1880. Inquiry held at Antigua, June 25, 1880. Master in default for careless navigation.

675. *Amelia*, ship; lost on the Laccadive Islands, April 4, 1880. Inquiry held at Cochin, May 22, 1880. Master in default for steering a course in too close proximity to the land. Certificate suspended for six months.

676. *J. S. Wright*, ship; abandoned at sea, May 17, 1880. Naval Court held at New York, May 27, 1880. Abandonment justifiable.

679. *Loch Awe*, barque; stranded on shoal off Port San Juan, Porto Rico. Naval Court held at Porto Rico, June 19, 1880. Casualty due to sudden shift of wind. No blame to master, officers, or crew.

683. *Sea Belle*, schooner; stranded whilst crossing the bar, April 9, 1880. Inquiry held at Port Alfred. Master free from blame.

684. *Maranhense*, s.s.; stranded in the English Narrows, Smyth's Channel, January 14, 1880. Naval Court held at Monte Video, June 7, 1880. Master acquitted of blame.

686. *Breconshire*, s.s., and Russian s.s. *Moscow*; in collision at Hankow. Inquiry held at Hankow, June 3, 1880. Accident due to a sudden freshet. No blame attached to officers.

690. *Coronet*, s.s., and *Gazet Kerim*, barque; in collision off Egyptian Coast, July 14, 1880. Inquiry held at Valetta, July 22, 1880. Master and officers free from blame.

691. *Abyssinia*, s.s.; took fire and foundered at sea, March 25, 1880. Inquiry held at Aden, March 29, 1880. Accident due to spontaneous combustion. Master and crew exonerated from blame.

SOUTH AUSTRALIA.—TELEGRAPHIC COMMUNICATION WITH CAPES BORDA AND WILLOUGHBY.—KANGAROO ISLAND.—Masters of inward-bound steam and sailing ships carrying passengers are requested to signal, when practicable, on passing the telegraphic stations at Cape Borda and Cape Willoughby, Kangaroo Island, as to any and what description of sickness has occurred during the passage. By so doing possible delay and inconvenience may be avoided. No charge will be made for sending such information to Port Adelaide.

GENERAL.

NEW ORLEANS HARBOUR WORKS.—The works which were begun in 1876, under the superintendence of Captain Eads, with the view of doing away with the obstructions caused by the bars at the mouth of the Mississippi are now practically concluded, and with every promise of a good result. For many years the Government spent annually $200,000 in keeping the passages clear by dredging, but every great storm that happened in the Gulf obliterated the channel, and the work had to be begun afresh. The new works have consisted in the formation of jetties extending from the land's end into the deep waters of the Gulf, and thus controlling the waters of the passage, so that the depth across the bar, which is 2¼ miles wide, has been increased from about 8½ feet —the depth before the work was commenced—to a wide channel with a *minimum* depth of 31 ft. through the jetties and 28 ft. at the head of the passage. The natural process by which the bar has been scoured away and solid banks formed behind the jetties appears to go on, as predicted by Captain Eads, and thus the mouth of the Mississippi is practically open. What with the perpetual forming of the bars and the increased size of ocean steamers, New Orleans was rapidly being left high and dry out of the stream of commerce, but with the present improvements, and especially if the channel between Vicksburg and St. Louis is narrowed and deepened, she will not only recover prestige as a cotton-shipping port, but will become the grain port of the States. An enormous amount of this kind of traffic would necessarily come to New Orleans as soon as the proposed canal from Chicago to the Mississippi is made.

THE
NAUTICAL MAGAZINE

FORTY-NINTH YEAR.

VOLUME XLIX.—No. X.

OCTOBER, 1880.

THE RECENT DEVELOPMENT OF THE CHINESE MARINE.

THE threatened quarrel between Russia and China has obtained for the affairs of the latter Empire an amount of notice which, in this country, at any rate, should never need extraneous stimulation. The prosperity of a considerable fraction of our stupendous maritime commerce is chiefly dependent upon our special relations with China, and the economic changes which are taking place in the condition of her people. It is, therefore, very desirable that, even if the negotiations between the Marquis Tseng and the Cabinet of St. Petersburg are carried to a pacific conclusion, we should not cease to direct attention to our own affairs in the "far Asiatic East."

It is doubtful if we have, indeed it is nearly certain that we have not, yet completely realized the vast importance of the position which, as a great trading nation, we hold in that remote portion of the Globe. That our transactions with the Chinese mercantile classes are great, that they are greater than those of any other Western people, we have of course long felt. But of how great they are in themselves and of how much greater than those of any of our neighbours, we have not yet formed any adequate conception. We have long been the foremost amongst the foreign

traders who have access to Chinese ports. Ever since we displaced the Portuguese and Dutch—or rather succeeded to the place from which they had been driven by the native authorities—now centuries ago, our transactions with China have surpassed those of our maritime rivals. But it is not till very lately that we have achieved anything like the unrivalled position which we now hold. M. Houette, a Sub-Lieutenant in the French Navy, has recently collected a large amount of information concerning the commercial and political affairs of China and Japan, and from the statistics which he gives we may select a few figures to show what our progress has been. Sixteen years ago, in 1864, when all the present "open" ports, except those opened by the late Chefoo Convention, at which there has as yet been hardly any development of trade—had been made accessible by the treaties of Tientsin and Peking, though we held the first place in the shipping lists, we had a competitor who ran us hard, as will be seen from the following statistics:—

Nationality.	Number of Ships Entered and Cleared.	Tonnage.
England	7,925	2,862,215
United States of America	5,086	2,609,390
France	247	93,099
Spain	69	20,359
Siam	156	68,395
China	1,022	64,568
Portugal	24	1,932
Austria	33	12,926
Holland	197	59,471
Russia	21	9,196
Japan	2	756
Denmark	1,317	168,802
Sweden	140	38,195
Germany (Hamburg, Bremen, &c.)	2,201	580,570
Other Countries	137	49,619
Total	18,526	6,639,515

From the above it will have been perceived, that of the carrying trade of the open ports we had, at the date named, a share falling short of half by quite half-a-million tons; and that the American tonnage was only ten per cent. behind our own, a difference that the fluctuations of business in a single year might have redressed. In fact in the then newly-established steam coasting-trade we were actually behind the Americans; and scarcely even attempted rivalry with them in the local navigation of the great rivers, for which—accustomed as they were to it in their own country—they seemed to possess special facilities and aptitude. Several years later our relative positions continued to be much the same. The total British tonnage entered and cleared in 1873, was 3,645,557, whilst the American was 3,483,203: which shows that the latter had even gained upon us by diminishing the percentage of difference between ours and theirs. Since that date, however, the condition of affairs has altered, as proved by the undermentioned figures:—

	1874	1875	1876	1877
British tonnage ...	4,738,793 ...	5,167,435 ...	5,181,644 ...	6,497,352
American do. ...	3,184,360 ...	2,777,367 ...	2,410,421 ...	556,112

Whilst we have not ceased to advance, the American shipping trade in China has continuously declined, till at length—in one year—there was a sudden fall which seems almost to threaten inevitable collapse. But the United States are not the only country whose business connexion with China, or at least whose share in the carrying trade of that Empire has been seriously contracted. In 1864, as we have seen, Germany not then united under a single flag, was represented in the Treaty-ports by about a tenth of the whole foreign tonnage and by an amount quite equal to a fifth of our own. This position she retained fairly well for some time, the figures for her tonnage for 1874 and 1875 being over half-a-million, and for 1876, over six hundred thousand. But in 1877, they suddenly declined by nearly 30 per cent. It is true that the gradual substitution of steamers for sailing vessels, by which latter she was chiefly represented, sufficiently explains the stationary nature of her shipping statistics. But—as even in 1878—the sailing ships entering and leaving Chinese ports were

82 per cent. of the whole shipping, and as neither their number nor tonnage was materially smaller in that year than in 1873, we have to look further for a complete explanation of the conversion of a cessation of progress into positive decline.

The explanation is to be sought for in the recent remarkable development of the Chinese marine, and in the altered policy of the Government of China, in reference to foreign trade. A glance at the table given on a former page will show, that in 1864 the share of China in the open trade of her own ports was—as expressed in tonnage—less than one-hundredth of the whole. In 1877 it was one-third. The statistics of this surprising advance are remarkable enough to excuse their being given at greater length. Omitting junk-tonnage, which until a year or two ago steadily increased, and perhaps even now shows no symptom of serious decline, the following are the figures for China in the undermentioned years:—

1873.		1874.		1875.		1876.		1877.	
No. of Ships.	Tonnage.	No. of Ships.	Tonnage.	No. of Ships.	Tonnage.	No. of Ships.	Tonnage	No. of Ships.	Tonnage.
344	176,017	899	444,771	1,557	811,344	2,133	1,336,656	5,104	3,908,064

This really astonishing augmentation is fully accounted for by the diminution of the tonnage of every foreign country except England and, to the trifling extent of some 3,000 tons, the Netherlands. The Chinese have won their present position from the Americans and the Germans, whose losses represent almost the whole of the gains of the former. Those who were at Hong Kong at the time will not have forgotten the sensation created by the announcement that the American flag had, some three or four years ago, finally disappeared from the Yang-tze-kiang, the navigation of which at one time seemed to promise to belong to it nearly as completely as that of the Mississippi.

The most important factor in this augmentation of the Chinese share in the local carrying trade of the Treaty-ports is undoubtedly

the existence of the *China Merchants' Steam Navigation Company* plying under the native flag, that flag which owes its recognition and existence to a convention with the Admiral of the foreign navies in eastern waters concluded not a score of years since. The Company now owns—the purchase of Russel & Co.'s American steamers having largely increased its fleet—33 steam vessels of 22,910 tons. The establishment of this Company and the extension of its operations, for it is not content with merely the greater share of the local trade, but proposes to extend its communications to foreign countries, are signs of the altered policy already alluded to.

Li-Hung-Chang, the Govenor-General of the "home" province of Chih-li, is the patron, and probably the real founder and supporter of this important association. He is a Chinese by race, and, as such and by the exalted position at which he has arrived, the leader of the Chinese or national party—if parties exist in our sense of the term in the middle Kingdom—in contra-distinction, or perhaps even opposition to the Tartar party of the Palace, the concrete ideal of conservatism and reaction. This eminent Mandarin has had the wisdom to perceive that the true way to rid China of the foreigner is, not to attempt to drive him thence by force of arms, but to struggle with him persistently in trade and harass him by sharp commercial competition. How he has succeeded in this the history of the American and German shipping trade tells us.

The late degradation and sentence of the ex-Ambassador Chung-How and the reversal of the latter, exhibited the conflict between the two policies; the "Anti-barbarians" policy of the Palace Eunuchs and the Tartar Kinsmen of the Emperor, and the commercial policy of Li-Hung-Chang favoured by the Tsungli-yamên. Chung-How's liberation and the mission of the Marquis Tseng to St. Petersburg mark the triumph of the more pacific party. For some time to come, at all events, the plans of the Chinese Government will be laid to stimulate the rivalry of their countrymen with the trading nations of the west, and to provide the Empire with a system of defence which may secure it against wanton insult and aggression. Whilst the Japanese have been ordering in Europe sea-going ironclads and unarmoured cruisers,

the Chinese have contented themselves with coast-defence gun-boats and guns for their river fortresses.

The attitude of the United States' Government with regard to Chinese immigration and shipping can hardly fail to further the schemes attributed to Li-Hung-Chang and his friends. The negotiations for the abrogation, or at least modification of the Burlingame Treaty, still proceeding, must give the Chinese authorities a chance to win for their countrymen a further share of the declining American trade. Left to itself, that trade shows but little sign of recovery; if further hampered by artificial restrictions nothing can save it from extinction. The Chinese have already begun to run a line of vessels bearing their flag to San Francisco, and the question is still discussed whether the discriminating duty of 10 per cent. *ad valorem* is to be levied on their cargoes. It seems that the President has statutory power to relieve, by proclamation, goods carried in Chinese bottoms from such discriminating impost. That if the relief be not granted the Peking authorities will reply in kind can hardly be doubted, and the result will be that the trans-Pacific trade will fall into the hands of some third marine.

There are lessons to be drawn from the present state of affairs in China which we certainly ought to learn. The real struggle for the advantages of the inter-treaty-port trade is now between the Chinese and ourselves. The former have defeated and practically driven off all competitors except us. The changes in the economic condition of the coast-provinces have hitherto been in our favour. The substitution of water for land-transport, and of steam for junk-navigation, conferred immense benefits on our shipping interests. The question is, Can we stand the competition to which we are now exposed? Time alone can supply an answer to this. The enormous resources of the Chinese as regards population give them great advantages in providing a supply of cheap labour on board ship. In this we also may share, and, indeed, have long shared. Artificers and stokers of Chinese race have for many years been employed on board the vessels both of our great steam companies and of our Royal Navy. It should be remembered that we have many thousands of Chinese fellow-subjects,

many of them of nautical habits who gladly engage beneath our flag. Fortunately we are not simply carriers; the cargoes of our ships entering and leaving the Chinese ports largely consist of commodities shipped on British account, and these we shall, almost of a surety, continue to entrust chiefly to vessels entitled to the protection of our Navy and supported by the commercial repute of the British name. Nevertheless it behoves us to watch carefully the movement of commerce in the far East, and especially that branch of it in which our shipping interest has so much concern.

ON COMPASSES, AND THEIR ADJUSTMENT IN IRON SHIPS.

(Continued from p. 740.)

IT has already been shown that the magnetic character of a ship depends upon the magnetic direction of the hull while building. If the magnetism were no other than that of the permanent magnetism of a steel bar, it might be easily dealt with. Its effect on the compass would be this: as the ship's head was moved in azimuth round an entire circle, there would be found two points of *no* deviation,—one being that of the ship's head when on the stocks, the other its opposite; between these two points are two semicircles, in one of which the deviation would be Westerly, and in the other Easterly,—the *maximum*, in each case, occurring at that point where the disturbing force was perpendicular to the direction of the deflected needle: for the intermediate parts or points of the semicircle the deviation would be proportional to the *sine* of the azimuth of the ship's head reckoning from the points of *no* deviation in the direction of the *maximum*. Also to put it in another way, supposing yourself to be standing in the centre of the compass, *looking towards* the direction of the ship's head when building, the semicircle to the right of you would have the Westerly, and that to the left the Easterly, deviation.

This, then, is the *semicircular* deviation, and its total effect is that which has just been considered.

But since the ship's force generally acts in a direction making an angle with the axial line of the ship, it has been deemed more convenient to substitute, for this single disturbing force, two disturbing forces —one acting *fore and aft* (represented in the formula p. 740, by the coefficient B), and the other acting *athwartship* (represented by the coefficient C). *See* also, Fig. 9.

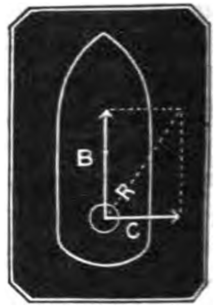


FIG. 9.

That part of the semicircular deviation represented by the coefficient B may be experimentally * illustrated as follows:—

A magnet placed before the compass with its S. end (*blue* pole) directed towards the compass, will draw the North end (*red* pole) of the needle to the ship's head, then, as the ship is turned round there will be, in the *Eastern* semicircle, a deviation of the North point of the compass to the right hand or East; in the *Western* semicircle, a deviation to the left hand or West.

A soft iron rod placed vertically in front of the compass, with its upper end at the level of the compass, this end, which will be a *blue* pole, will attract the North end of the needle, and produce a deviation of exactly the same kind as the magnet described above as having its *blue* pole pointing to the compass. It will, therefore, simply increase the semicircular deviation caused by the magnet.

If the N. end (*red* pole) of the magnet, or the lower end of the rod, be nearest the compass,—or if the magnet or rod be abaft the compass, an effect of the same kind, but in an opposite direction, will be produced.

For the other part of the semicircular deviation, represented by

---

* You require the form of a ship's deck cut out of paper, a pocket compass 1½ to 2 inches in diameter, two small magnets about 2 or 3 inches long, and a soft iron rod; these you can so manipulate as to illustrate the phenomena of a ship built in any direction, if you previously determine the cardinal points in respect to the table on which you place your imaginary ship, and move the latter on a centre.

the coefficient C, place a magnet to starboard or port of the compass; it will produce an effect similar to that already described, except that a deviation of one kind will be the result when the ship's head is in the Northern semicircle, and of the other kind when in the Southern semicircle.

The effect of the two magnets and the one iron rod make up the whole of what is called the semicircular deviation; for which

$$d = B \sin z + C \cos z$$

B being the semicircular deviation on the East course or point by compass, and

C the semicircular deviation on the North course.

It may also be noted here that the sign + is used for East, and the sign – for West.

Each of the coefficients B and C may have the signs *plus* and *minus*, as significant of the direction in which the ship was built, and the character of the semicircular deviation produced therefrom.

B is the representative of a force acting fore and aft.

+ B indicates that the ship was built with the head in some Southerly direction, and that the ship's force attracts the N. (red) end of the needle towards the head, the consequence of which is that, in respect to the compass, it produces E. deviation in the Eastern semicircle, and W. deviation in the Western semicircle, as shown by the signs in Fig. 10; also with the *maximum* at East and West.

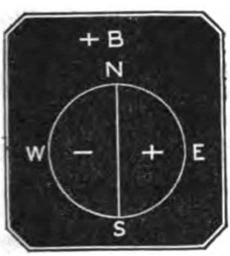


FIG. 10.

FIG. 11.

– B indicates that the ship was built heading in some Northerly direction, and hence has a force attracting the N. end of the needle towards the stern, from which it results that, in

respect to the compass, there is W. deviation in the Eastern semicircle, and E. deviation in the Western semicircle, as shown by the signs in Fig. 11; also with the *maximum* at East and West.

C is the representative of a force acting athwartship.

+ C indicates that the ship was built with the head in some Easterly direction, and that the force attracts the N. end of the needle towards the starboard side, giving E. deviation in the Northern semicircle of the compass, and W. deviation in the Southern semicircle, as shown by the signs in Fig. 12; also having a *maximum* at North and South.

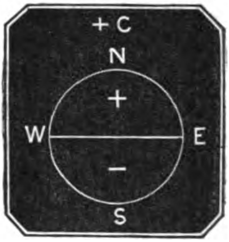


FIG. 12.

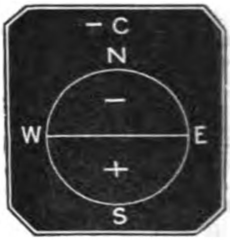


FIG. 13.

− C indicates that the ship was built heading in some Westerly direction, and hence has a force attracting the N. end of the needle towards the port side, giving W. deviation in the Northern semicircle, and E. deviation in the Southern semicircle, as shown by Fig. 13; also having a *maximum* at North and South.

Hence the distribution of each coefficient of the semicircular deviation, according to the direction of the ship's head when building, is as follows:—

Ship built head	North	gives	− B	
,, ,,	N.E.	,,	− B and	+ C
,, ,,	East	,,		+ C
,, ,,	S.E.	,,	+ B and	+ C
,, ,,	South	,,	+ B	
,, ,,	S.W.	,,	+ B and	− C
,, ,,	West	,,		− C
,, ,,	N.W.	,,	− B and	− C

Thus far the semicircular deviation has been spoken of as if it were easy to find, unchanging, and easily corrected if so required. But unchanging it is not.

You have already been told that the earth's horizontal force is greatest *near* the magnetic equator, and decreases when proceeding Northward or Southward from that line; also that the dip of the needle (and hence the vertical force) is the reverse of this,—being *nil* on the magnetic equator and increasing when proceeding Northward and Southward in the direction of the earth's magnetic poles, and what is more, with a different pole of the needle downwards in the two hemispheres.

Now the coefficients B and C, which give the semicircular deviation, are *each* made up of two components, viz., (1) the subpermanent magnetism of the hard iron, and (2) the transient magnetism induced in the soft iron by the earth's vertical force. The first produces a semicircular deviation inversely proportional to the horizontal force at place; the meaning of which is that, though there is no change of name, there is decrease in amount with increase of the earth's horizontal force, and *vice versâ*. The second produces a semicircular deviation proportional to the tangent of the dip; the meaning of which is that not only is there change of amount—decrease with decrease of vertical force, and increase with increase—but, on opposite sides of the magnetic equator there must be change of name. It does not, however, follow from this that the deviation as a whole must change its name, which will depend upon the relative proportion of subpermanent to transient induced magnetism.

When B and C are uncorrected, it is easy to understand that a deviation card has but a limited value, and that the change of deviation due to change of magnetic latitude requires to be constantly checked by observations of the heavenly bodies: and this remark applies with equal force to a compass where B and C have been corrected with permanent magnets, since it is impossible that these can compensate a changing element.

A soft iron mass and horizontal soft iron exert a wholly different influence on the compass from that hitherto described.

Note the effect of a soft iron ball* on the needle when carried round the compass in the same horizontal plane. See Fig. 14.

At 1 the spherical ball of soft iron lies in the magnetic meridian, and North of the compass; it therefore, according to the law of like poles repelling and unlike poles attracting, produces no deviation, but the directive force of the needle is increased.

At 2 the sphere lies in the N.E. quadrant, it therefore, since the attraction is towards the right, gives E. deviation in that quadrant, and the directive force of the needle is increased.

At 3 the sphere lies East of the compass, and at right angles to the direction of the needle, where it gives no deviation, but still increases the directive force.

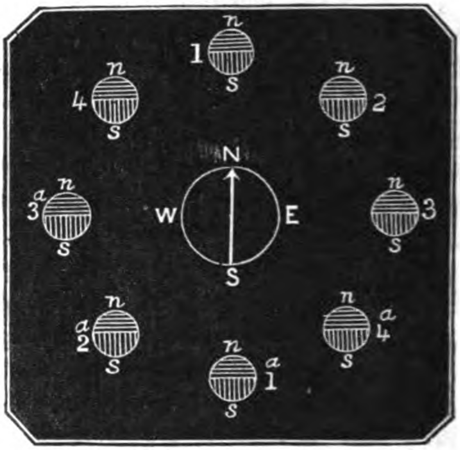


FIG. 14.

At 4 the sphere lies in the N.W. quadrant, it therefore, since the attraction is towards the left, gives W. deviation in that quadrant, and the directive force of the needle is increased.

With the sphere at 1^a, 2^a, 3^a and 4^a, the effect on the compass must be similar to that of the respective positions 1, 2, 3, 4; that giving no deviation at South and West, E. deviation in the S.W. quadrant, and W. deviation in the S.E. quadrant.

* An iron sphere is really, as already indicated, slightly magnetic in the direction of the dip; and so must be elongated iron correctors; the illustration nevertheless holds good.

To sum up—

Soft iron in the horizontal plane of the compass invariably increases the directive force of the magnetic needle.

Soft iron in the horizontal plane of the compass gives no deviation at the four cardinal points, N., E., S., and W. by compass; but the other points in each of the four quadrants are affected as follows;—if the iron lies in a direction—

between	N. and E.,	it produces	Ely.	deviation
,,	E. and S.,	,,	Wly.	,,
,,	S. and W.,	,,	Ely.	,,
,,	W. and N.,	,,	Wly.	,,

Two soft iron masses on opposite sides of the compass and in the same plane affect the needle to the extent of the sum of their mass and force. Two masses situated at right angles with each other increase the directive force to the extent of the sum, and produce a deviation equivalent to the difference, of their forces.

It remains to consider the effect of soft iron extending (athwartship, and fore and aft) in a horizontal plane, parallel with that of the compass, but *under or over* the compass.

As the ship's head is turned in azimuth the *ends* of any such iron (as for instance, the deck beams) change the character of their polarities,—what had been previously *n* or *red* becomes *blue*, and what had been *s* or *blue* becomes *n* or *red*.

Hence the following results—

When the ship's head is E. or W., the soft iron beam lies under the compass, extending in each direction beyond it, and, like the compass needle, is in the magnetic meridian; the repulsion (of like poles) occurring *in* the meridian produces no deviation, but the directive force of the needle is diminished. Similarly, when the ship's head is N. or S., the soft iron lies East and West, and it produces no deviation, but still diminishes the directive force of the needle. *See* Fig. 15.

FIG. 15

When, however, the soft iron lies N.W. and S.E., it produces E. deviation in the N.E. and S.W. quadrants, and diminishes in each case the directive force of the needle. Fig. 16 shows the ship heading N.E.; the needle is deflected to the *right* of the dots (*cor.* mag. N. and S.) by the *red* and *blue* (*n* and *s*) poles of the beam, and consequently the deviation at N.E. is Easterly; and similarly throughout the quadrant, but differing in amount on different points.

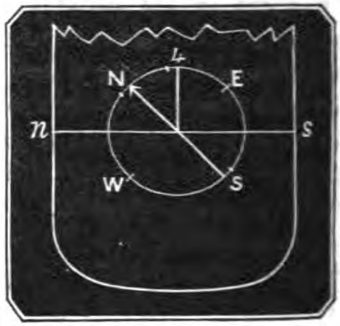


FIG. 16.—HEAD N.E.

Lastly, when the soft iron lies N.E. and S.W., it produces W. deviation in the S.E. and N.W. quadrants, and, as before, diminishes in each case the directive force of the needle. Fig. 17 illustrates the ship heading S.E.; the needle is here deflected to the *left*, and consequently the deviation at S.E. is Westerly.

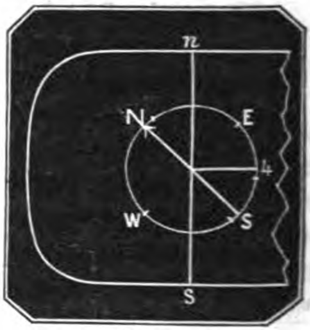


FIG. 17.—HEAD S.E.

Inasmuch as B and C are called the coefficients of the semicircular deviation, since they are connected with the compass as divided into two semicircles, so here, since the horizontal soft iron of the ship acts differently in different *quadrants*, the resulting *deviation* is said to be *quadrantal*.

It is also well to take note of the difference, in the effect on the compass, between the sphere of soft iron and the soft iron beams, &c.; the first, with attraction, increases the directive force of the needle; the second, with repulsion, diminishes the directive force; therein lies the method of correcting the quadrantal deviation.

The late Archibald Smith neatly put the effect of horizontal ...n on the compass as follows:—

...horizontal soft iron rod placed in front of and directed

towards the compass will, when the ship's head is N., E., S., or W. produce no deviation. When N.E. and S.W. it produces a deviation to the right hand or E., and when S.E. or N.W. a deviation to the left hand or W.; it therefore produces what is called the *quadrantal* deviation.

"A horizontal soft iron rod directed to the compass, but placed to starboard or port, will produce an effect of exactly the opposite kind, and would correct that produced by the first rod; but if the second rod, instead of being on one side, passes, as it were, through the compass, it would produce exactly the same effect as the first rod. The two rods will then conspire to produce the quadrantal deviation.

"A quadrantal deviation of the same kind will be produced if the first rod instead of being on one side of the compass passes through it, provided always that its *force* is less than that of the transverse rod." Hence—

The quadrantal deviation, represented in the formula p. 740 by $d = \mathrm{D} \sin 2z + \mathrm{E} \cos 2z$, arises from *horizontal induction in soft iron*, and, in an iron ship, it is not alone the horizontal soft iron *near* the compass that gives it, but all connected with the hull, keel, frame and fittings trending athwartship, fore and aft, and diagonally, over, under, and in the plane of the compass; in addition to which, in a steamer, there are the engine, screw-shaft, &c. Some of this iron gives a *positive*, and some a *negative*, quadrantal deviation, but the difference of the two is, in the majority of cases + D, it being rare to find − D; and from the fact that the positive deviation is accompanied with a diminished directive force the effect of the transverse iron most probably preponderates.

The coefficient D produces the greatest error on the N.E., S.E., S.W., and N.W. points of the compass, and + D. in the formula gives + or E deviation in the N.E. and S.W. quadrants, and − or W. deviation in the N.W. and S.E. quadrants. Fig. 18.

− D is the reverse of the foregoing, giving + or E. deviation in the N.W. and S.E. quadrants, and − or W. deviation in the N.E. and S.W. quadrants. Fig. 19.

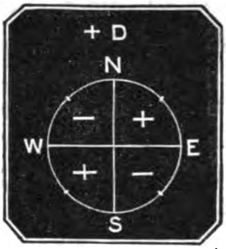


FIG. 18.

FIG. 19.

The coefficient E arises from horizontal induction in soft iron which is unsymmetrically distributed in relation to the position of the compass, and at an angle with the midship line. Its maximum effect is found at the four cardinal points, giving *nil* at N.E., S.E., S.W., and N.W. In a sailing ship it does not exceed 2°, and is usually less; but in a steamer, with the steering wheel brought forward, before the engine, it is often more.

W. H. R.

(*To be continued.*)

THE RULE OF THE ROAD AT SEA.

To the Editor of the "Nautical Magazine."

SIR,—Parliament having re-appointed the Committee on the Rule of the Road at Sea, the present seems to me a favourable opportunity to raise, in the pages of the *Nautical*, a discussion on the new Rule of the Road which has become law this month. I begin by contributing the following remarks on what appear to me to be, in the application of the Rules by night, either important omissions or dangerous ambiguities in the new Rules, now law.

When a steamer has a tow astern that condition is indicated to approaching vessels by the two masthead lights on the steamer. The object announced is thereby known to be not simply a steamer or simply a sailing vessel, but both. Is the approaching vessel ›onsider that that double object is bound to act as a steamer, › a sailing vessel? An approaching sailing vessel might

reasonably enough treat the double object as a steamer only, and stand on to it, and such may safely be said to be the general practice.

Now let us suppose that the approaching vessel is a steamer seeing the two masthead lights a point or two on her own port bow. Is the tow in every case to keep out of the way of the steamer seen to starboard according to Article 16?

In the first case the approaching sailing vessel may have a fair wind and be running down on the towing steamer, which may at the time be labouring against a strong head wind and sea, and with scarcely steerage way sufficient to keep her head to it. Would it not be well to define that these special circumstances, if clearly made known to the approaching vessel, are to be considered such as by Article 24 require the exercise of precaution, and consequently action, on the part of that approaching vessel; that is to say, if a steamer having a vessel in tow and only holding her own through stress of weather shall indicate that condition to approaching vessels by hoisting, in addition to her usual lights, say, a red light 3 feet below her masthead lights, that vessel shall then be treated by all other vessels as a vessel not under command.

A steamer even without a tow is, also, as compared with a sailing vessel running down upon her with a fair wind, often helpless through stress of weather. The same signal should therefore be exhibited by such a steamer, say a long passenger steamer with difficulty keeping herself out of the trough of the sea. The sailing vessel approaching her with a fair wind should not expect that steamer to endanger the lives of all on board by endeavouring to get out of her way, when a few spokes of the helm is all she requires on her part, not even touching a brace. The absolute necessity of such a rule appears to be more urgent when we consider that the steamer's position is probably known to the sailing vessel long before the existence even of the sailing vessel becomes known to the steamer, not only by the greater range of the masthead light but also by the distinguishing coloured side-lights, which, in such a steamer, are always the best and most powerful procurable for money, while those of the sailing vessel are often just what will barely pass

inspection. The time between the sailing vessel being first seen and possible collision would generally be too short for any effective action on the part of such a steamer.

When these possible cases are thought out it becomes conceivable that with a clever counsel a court would give judgment in favour of such an action, even on the Rules, as they now stand, in respect to the steamers in both of these cases.

In fog or thick weather vessels are supposed to make known what they are by arranged sound-signals; but what fog-signal is prescribed for a sailing vessel in tow? It would only confuse the other vessel to adopt the signals denoting how she has the wind, for her course is not at all maintained by the wind, but by the steam power of the tug-boat. If the towing steamer could intimate that she has a vessel in tow that would be perhaps sufficient, but the Rules do not at present provide any sound-signal to announce distinctively the presence of a steamer with a vessel in tow. The sound-signal of a steamer towing is precisely the same as that for any other steamer, and in a fog a steamer having another steamer signalled on her own starboard bow would aim to clear that steamer by going, say, under her stern, and would have no notice of there being a sailing vessel towed astern with perhaps 90 fathoms of hawser intervening.

There does not appear to be any objection to the ringing of a bell by a vessel in tow in a fog. This signal could not clash with the anchor-signal if the Rule be that the bell shall be rung immediately after each steam-whistle signal made on board the towing steamer.

An important question sometimes arises, do the Rules impose any duty on a hove-to vessel by night beyond making her position known? Is a hove-to vessel to be considered by those in charge to be a vessel *not under command*, and therefore prescribed for in Article 5, viz., that she, as "not making any way through the water, shall not carry the side-lights." A similar question arises in regard to vessels becalmed—are they to exhibit their side-lights?

To every approaching vessel the vessel becalmed is an overtaken ship, and as such is provided for, whatever be the direction of approach, for while becalmed the distinction between head and

stern is lost. The stern-light exhibited in the direction in which a steamer is seen to be approaching would be readily understood in this case, but a hove-to ship ought to be otherwise distinguished.

While permitting the handicapped towing steamer to claim forbearance from vessels possessing greater freedom of action, the towing steamer has not as above proposed been allowed to represent herself quite as a vessel disabled by accident; her side-lights being still exhibited announce her to be a vessel *trying* to make way, overpowered by the weather, but not herself disabled. In the case of the hove-to vessel would it not do to exhibit, in addition to her side-lights, an anchor light three feet above the fore end of the leeward light screen? She is already protected by Clause (a) of Article 14, from vessels on her weather side.

In fog or thick weather perhaps the bell would be the best signal for a vessel hove-to on the port tack while on the starboard tack by Clause (a) no distinguishing hove-to signal would be requisite.

To illustrate the need of some such method for distinctly signalling the condition of the hove-to vessel when her state cannot otherwise be known to approaching vessels, let us suppose two ships, one making headway on the starboard tack and the other hove-to on the port tack, perhaps to take deep-sea soundings, or it may be waiting for daylight to enter port, or for a pilot. The ship on the starboard tack should, by the Rules, keep on her course trusting that the other vessel is making headway on the port tack. By daylight, however, the ship close-hauled on the starboard tack, if handled according to the ordinary practice of seamen, would, even in the finest weather, keep clear of the hove-to vessel. In bad weather it might be positively dangerous to require the hove-to vessel to take up the responsibility of keeping out of the way of any approaching vessel, which by the Rules is directed to keep her course, because of the difficulty of getting way on the hove-to vessel in time to avoid collision, and because of the risk to a small vessel when falling off into the trough of the sea.

In a fog if the vessel hove-to on the port tack carries out the Rule for sound-signals all vessels approaching her will be misled

into a belief that a vessel near them is making headway on the port tack, and, if the approaching vessel be on the starboard tack, to expect that vessel to get out of her way.

Article 14, Clause (d), of the new Rules differs ambiguously from Article 12 of the old Rules. The new Rules leave the case of the two sailing vessels close-hauled on the same tack unprovided for.

Clause (d) of Article 14 is substituted for the latter clauses in Article 12 of the old Rules. It has been probably unintentionally that the modified Rule has omitted altogether the case of two vessels close-hauled with the wind on the same side. The old Rule of the windward ship provided for such positions, but the new Rule limits the windward ship Rule to vessels running free, which can hardly be said to include even ships with the wind abeam, which are never by sailors spoken of as *running*.

Let the windward vessel of the two close-hauled vessels be laying her course, and let the other be the more weatherly of the two, the lee ship may come up on the lee beam of the other and her commander might then, without hesitation, were it daylight, give his vessel an extra luff or two and shoot her to windward under the other vessel's stern. If, however, it be night time he would hesitate before doing so, fearing to miscalculate the distance, and, in the meantime, the commander of the weather ship, not liking the close proximity of the other, might lay his main or mizen topsail to the mast to allow him to pass ahead and to windward, doing so, perhaps, just at the very moment when the other had summoned sufficient resolution to luff his ship; the consequence would be a collision. This uncertainty of action would be avoided by restoring the windward ship Clause in its entirety as in the old Rules, that, when the two vessels have the wind on the same side the responsibility is with the windward ship *in every case* whether free or close-hauled. This provision is in harmony with the rest of the new Rules.

I am, yours truly,

P. THOMPSON.

London, 11th September, 1880.

THE PORT OF CHITTAGONG.

CHITTAGONG is situated in the north-east corner of the Bay of Bengal, almost at the mouth of the Megna river, and is a port which is slowly, but surely, creeping into prominence.

It will never become a resort for the largest-sized steamers, the narrowness of the river, and the shallowness of the bar at its mouth being against it, but at the present time it is a good port to go to with ordinary-sized vessels.

Although there is only 10 feet of water on the bar at low water springs, the tide rises 15 feet. I crossed the bar in January in a steamer 300 feet long, drawing 21 feet 3 inches, the day before full moon, and carried 4¼ fathoms all the way, excepting one cast of ¼ less 4 close to the outer bar buoy.

In the dry season the water is very much less than in the rains, when a big ship can swing loaded abreast the town.

If the Government of India would only spend a little money on it, in laying down fixed moorings, so that a vessel could make fast head and stern, then ships of large tonnage, and not drawing over 23 feet, could use the port with perfect safety.

The drawback to it now is, that abreast the town only a vessel of moderate length can swing at her anchors, and to moor one of 300 feet in safety, so that she will swing clear of the banks on both sides when her cargo is loaded, you will have to move down about two miles below the town, and this is very inconvenient.

Chittagong holds out many inducements to steamers of medium size as well as sailing ships. It is about the cheapest port to go to in the east. The port dues are about the same as in Burmah, but labour and provisions are very much less, and with good facilities for taking in cargo. A vessel carrying about 1,400 or 1,500 tons of rice, could easily load it in about three days and be off.

There is mail communication with Calcutta by steamer twice a week.

From the bar buoys to town is about twelve miles, so the river work is soon got over, and after two visits to the place you can learn all about it for yourself, even with ordinary care and attention in following the buoys. A stranger with a light steamer could find his way up alone, as the channel is splendidly buoyed, and looked after by the port officer, Mr. Good.

If you are bound to the port in a steamer, you can either close with the land at Elephant point, and having found your position accurately, by a four-point bearing of the summit, shape your course for the buoy on the North patch, this takes you inside the Kootubdeah banks and dangerous South patch; from the North patch buoy, alter the course for a spot about four miles off Petunga point, keeping the lead going, and checking the running by a four-point bearing of Kootubdeah lighthouse. The tides hereabouts set pretty well up and down the coast, and with careful attention to the lead you cannot come to much grief.

Although there is no mark on the South patch, by keeping a sharp look-out from aloft, you can see the water churning over it in quite time enough to give it a wide berth.

If you are coming up outside of all the banks do not bother yourself trying to find out which is North summit and which is Snob peak, the probabilities being that you will see a line of moderately high land in the background, low in front, clad with jungle and big trees, the top hidden by clouds, and the base obscured by a whitish haze. Keep your lead going and remember that you will get a great deal more water than your chart shows, expect to get from 1½ to 2 fathoms more, edge in until you get hold of Kootubdeah lighthouse, then coast up to the mouth of the river.

Unless you are familiar with the place do not take liberties with it at night. If you pick up Kootubdeah light you are safe, but the Norman's point beacons and lights are about as mean contrivances as could well be put outside of a port. They are so low that by night the haze in the north-east monsoon often conceals them, and by day when you pick them up from amongst the trees the background, you should almost be standing by your

As you draw near the port in the north-east monsoon, you need not be uneasy if you come across large things in the water like floating haystacks. They are only bamboo cages rigged up over the fishing boats, to dry the fish caught hereabouts. You will find them moored in from 6 to 18 fathoms.

The tides sweep across the river mouth, and it is advisable to steam up on the last of the flood. You can then select your anchorage on the beginning of the ebb, and get things ready if you decide to moor head and stern. The port authorities will give you all assistance that lays in their power, and by getting the loan of an anchor and chain from them, and hiring a cargo boat to run it out, you could moor your ship easily in one tide, within 60 yards of the godown door.

If you are chartered to go there for a cargo from some of the Indian ports, telegraph to your agent and ask him to bespeak a good pilot for you. You will find him most likely off Kootubdeah lighthouse, or between that and Norman's point. There are two very nice pilot boats, one a cutter, and one a schooner, of good tonnage; they fly the usual pilot flag, red and white horizontal.

All the pilots are natives, and some of them speak very good English. Use tact and forbearance with them while they are with you; stay with them on the bridge, and give them any assistance you can render. They know the river well enough, but must be left to work the vessel their own way. An angry word sends all their wits astray, and you render them quite useless.

The gateway is marked by two conical buoys; the North one has a staff and cage on top, the South one is plain. You will get the deepest water by passing close to the northward of the South buoy, say half a ship's length, to a ship's length off it, then haul gradually over towards the northern buoys, and cross the flat keeping mostly to that side. After passing the flagstaff you are off the flat, and are into deeper water. You now draw in towards the eastern bank and follow it along, until you make out the spit buoy to the westward. It is a small iron buoy, and is shifted as the end of the spit shifts. You turn this at rather a sharp angle, and point the ship's head towards the western bank. A little past this there is another bar to cross, and that ends the dangers. You

then keep along the western bank pretty close to, until you get up to the anchorage.

Past the inner bar, the Western Bank of the river is steep-to, with deep water close in, while the eastern bank has long mud flats projecting out from it. It may happen that the scouring of the tide along the face of the western bank, causes small portions to crumble away ; if so, your pilot will point the places out.

The deepest spot in the river for a long ship to swing in safety, is about two miles below the iron wharf. As you draw near it, you will notice a creek in the western bank, in which many of the native brigs are laid up. The spot is about 100 yards below the mouth of this creek, and the marks are, the eastern gable of Bullock Brothers rice godown, just open of a white bungalow among green trees, on a hill beyond the town.

The rice godown is a long, low building, made of mats and thatched with straw, with its gable to the river and built close to the bank.

The bungalow is partially concealed by shrubs around it, but the white pillars of the verandah show very prominently through the trees, and as it is right in front of you, as you steam up towards the creek, you cannot possibly mistake it, neither can you mistake the godown which will be within a mile of you when you anchor.

In this spot, a 300 feet ship may swing in perfect safety, and with a little to spare, drawing 23 feet.

The town of Chittagong is not very imposing, being very much scattered. Some of the houses are built of brick, others of wood, but the bulk are of mats with thatched roofs. The Government offices are of brick, and there is a nice iron wharf run out close to the Custom House. The residences of the Europeans are prettily situated on the rising ground in the vicinity of the town, and there are some good drives about the place.

Poultry of all kinds is plentiful and cheap. Beef and mutton indifferent in quality, and moderate in price. Yams, vegetables, and fruit, good and cheap. Potatoes and the better class of vegetables come from Calcutta. Water is dear, and hard to procure ; the best is got from a tank near the church. It is filled

into barrels, and brought down on bullock carts to the river-side for shipment, but if not carefully watched, the suppliers fill the barrels at the first puddle they come to and cheat you.

Labour is plentiful, but you must attend to the stowing yourself; if you work at night you will be charged double. Good cargo boats are scarce, but there are any quantity of the native sort, which hold four or five tons each, and leak like baskets.

Large quantities of tea grow in the neighbourhood, and immense quantities of jute are shipped away annually. The new rice comes in about the middle or end of October,* the harvest being very early in comparison with Burmah; very little of the rice goes to the home markets, most of it finds its way to Ceylon and Mauritius. It is very dark in colour, owing to the primitive manner in which it is husked, being first par-boiled, which swells the kernel and bursts the husk, then spread in the sun to dry; the kernel collapses, and the husk is left open. It is then rubbed between the hands and thrown up in the wind; the wind blows away the husk, while the grain drops back on a cloth spread to receive it. It is shipped in single gunny bags, containing two Bengal maunds, equal to 168 lbs.

Rice, jute, and other produce coming down to Chittagong from the river Megna, all comes at neap tides, as there is a heavy bore in the river at springs, which renders it impassable for native boats.

J. McKIRDY.

THE CIRCUMNAVIGATION OF SOUTH AMERICA.

THE following abstract of a letter from the *Times'* special correspondent at Monte Video will doubtless be perused with interest by many of our readers:—

"Owing to the intricacies of the Strait of Magellan, the route round the Cape was preferred by mariners for three centuries, in

* There are two rice crops in Chittagong, one in October and the other in January.

spite of the storms which made that locality even more formidable than the Cape of Good Hope; and it was only in 1868 that the steamers of the Pacific Mail Company opened a regular line of communication along the Strait, gradually surveying its hitherto almost unexplored coasts, and making its navigation so safe and easy as to enable Mrs. Brassey and her husband to steer their yacht *Sunbeam* through it in 1876.

"Long before that date, however, steam navigation along the eastern coast of the Pacific was in full activity. There lived for some time at Valparaiso an engineer and shipbuilder, William Wheelwright by name, a native of the United States, to whom the Republic of Chili was so deeply indebted that it raised a statute to his memory in a little triangular space called a square in Valparaiso. Mr. Wheelwright, who first conceived the notion of a railway across the Andes, was also the originator of the Pacific Steam Navigation Company. He had something of the vastness of conception and perseverance of a Columbus, and met also with some of the fortunes of the great Italian navigator. Like Columbus, he first applied to his native land for the furtherance of his scheme, but, failing to make any favourable impression in New York or Washington, he addressed himself to England, where his views were better understood and appreciated. Two steamers, the *Peru* and *Chile*, destined to ply along the coast between Callao and Valparaiso, were built in Liverpool in 1840, and made to sail round Cape Horn, while their engines were conveyed across the Atlantic to Colon, and hence by land across the Isthmus to Panama. A few years later (1844) the company was organised, and the two steamers with which it began rose to the number of 53, with an aggregate tonnage of 123,654, eight of their vessels exceeding 4,000 tons each, and their capital, which was originally £250,000, was raised to £500,000 in 1859, and to £4,000,000 in 1874. Their steamers extended their voyages to Panama in 1847, and, as I said, one of their lines began in 1868 to ply between Liverpool and Valparaiso, *viâ* the Magellanic Strait.

"To come to some understanding of what this Pacific Company has done for the welfare of the South American States of the western coast, it will be sufficient to quote that 'at the beginning

of this century it was only at intervals during the year that an anxious crowd at Valparaiso were watching for the solitary sailing vessel from Peru which was to bring them news of the world and such supplies and luxuries as might benefit a needy outlying province.' Contrast this state of things with the conditions of this same port in 1874, when 'about 3,000 vessels, one-third of them steamers, entered or left it, while 11,000 traded in the year in all the harbours of the Chilian Republic.' Consider, also, that the vessels of the company, which at first only called at six great ports in the whole length of the coast, now transact business at 64 harbours, at each of which are busy agencies, that of Valparaiso alone employing above 150 clerks and other attendants. Add to this that 'each ship which leaves the western coast twice a month for Europe, *viâ* the Magellanic Strait, carries an average cargo of 2,500 tons, chiefly composed of copper, wool, sugar, cocoa, and bark; so that the company's vessels ship some 65,000 tons of valuable merchandise in the course of a year.' Be it also remembered that until lately Peru and the whole of Northern Chili, destitute of all means of communication by land, cut up into narrow valleys by impracticable mountain ridges, only relied for their home and foreign intercourse on sailing vessels, the traffic of which was exposed to the inclemency of the southern gales perpetually sweeping along the coast; so that a voyage from Callao to Valparaiso required whole months' tacking and veering, while now the steamers ply along the coast from end to end, touching at every port once and even twice a week, monopolizing all the trade along the water-way. For, although the success of this Pacific line stirred other companies to emulation—the English White Star Line, the French Messageries Maritimes, the Compagnie Générale Transatlantique (this latter backed by all the might of the Third Napoleon), and a 'Belgian Royal Mail' and several others—all these rivals were driven from the field by the perseverance of the Pacific Company, not without heavy sacrifices; so that there only remain the 'South American' and the Hamburg line 'Kosmos' which have been wise enough to accept such friendly terms as the Pacific Company offered, and to carry on such business as enabled them to come in for a small share of its profits, without in the least clashing with its work or interfering with its great interests.

"The Government and people of the United States of North America are naturally jealous of the monopoly of trade which the establishment of these European steam navigation companies, and especially of the Pacific line, insures for their respective countries; and Mr. Frälick, a Commissioner of the Post Office at Washington, who, in 1878, was sent to make some postal arrangement with all these South American States, dwelt at great length in his report on 'the fact everywhere apparent that the recent splendid growth of commercial cities and the enterprise shown by the leading citizens of the South American States are mainly due to the influence of these lines of communication with the heart of Europe.' And he used every argument to stimulate both the private enterprise and the Government patronage of the Northern Union to strenuous exertions to compete with these European lines, so that a share of the benefits accruing to the Old World from the activity of its steam navigation might fall to the lot of American speculators. Nothing as yet has come of these eloquent patriotic exhortations; for, on one hand, the European, and especially the English lines, have cast such deep roots and taken so strong a hold of the South American trade—in one word, they have become so big—as to defy the competition of any rival company, whatever amount of means and energy it may muster; and on the other hand, however shrewd and pushing and all-engrossing Yankee speculation may be, especially in the matter of railways, it has seldom turned its energies to Trans-atlantic steam navigation, and none of its attempts in that direction have met with permanent success; so that all the inter-course of the United States with the Old World is now as utterly dependent on European steam navigation for its continuance as it was in the days of the Sirius and Great Western for its initiation.

"To accomplish the circumnavigation of the South American Continent I embarked at Valparaiso on board the Pacific Mail Company's steamer *Valparaiso*, of 3,575 tons, Captain Hamilton, bound for Liverpool and calling at Punta Arenas, Monte Video, Rio Janeiro, Lisbon, and Bordeaux. From Valparaiso the steamer took us in 24 hours to Lota, and hence, after a few hours' stay, we

proceeded on our southward voyage along the coasts of Arauco and Valdivia, keeping to the open sea, outside the Island of Chiloe and outside all that long archipelago that lies along the coast down to the end of the continent.

"The South American continent, as one may see by a mere glance at the map, is a huge triangular mass, solid and compact, with few very wide or deep bays, and few projecting headlands, either at its base on the north, or on either of its sides on the east or west; but it breaks out, as it were, into innumerable fragments at its point on the south, forming a maze of large and small islands, peninsulas, capes, and promontories, intersected everywhere and interlaced by straits and creeks and coves; a maze of fragments in a net of channels; a little world all cracked and starred and pulverised like a shattered plate of glass or china; a labyrinth of land and sea, of which it is as difficult to decipher the outlines in the map as to put together the pasteboard pieces of a child's puzzle. Until the invention of steam, large vessels that trusted to their sails for propulsion and needed a wide berth for their manœuvres, eschewed these narrow passages, dreading less the constant head winds and awful storms of Cape Horn than the treacherous calms, the rocks and shoals, the fogs, and chopping seas of land-locked channels. But, with the progress of steam navigation, preference began to be given to smooth waters, and man, aware of its new power to make his way, not only without the help of wind and tide but even in strenuous opposition to both, abandoned the open sea whenever and wherever a quiet and safe passage could be made through sheltered inlets and outlets and steered within friendly banks.

"It is thus, as I have said, that, after struggling for three centuries by the open route round Cape Horn, mariners have now come back to the inner passage which Magellan had opened for them at the outset; and the same wish to shun the boisterous gales that incessantly blow from the South Pole induced the Pacific Company to run its steamers along what is called 'Smyth Channel' a narrow gut about 360 miles in length, which, south of the Island of Chiloe and the Peninsula and Archipelago of Taitao, enters at the Gulf of Peñas, passes through a line of channels of

various names between the main land on one side and Wellington, Madre de Dios, Chatham, Hanover, and Queen Adelaide Islands on the other, and issues forth at Cape Philip, at the head of Parker Bay, near the western entrance of the Magellanic Strait.

"This line, which, besides smooth sailing, offered to the passengers the advantage of a succession of the most sublime scenery of mountain and glacier, was lately given up by the Pacific Company, owing to the difficulties the largest steamers encountered at some of the tightest passes, and especially at the so-called 'English narrows;' but hopes are still entertained to resume the traffic along this route, the scheme being to follow the Symth Channel from its southern end, at Cape Philip, as far up as the Gulf of Trinidad, and hence, leaving the 'Wide Channel' the 'English narrows' and the 'Messier Channel'—the old way to the Gulf of Peñas—on the right, to proceed outside Wellington Island, and between this and Campana Island, along a new line of channels, which, under the names of 'Picton Channel' and 'Fallos Channel' would equally reach the Gulf of Penas. This projected new route, which has only been partially explored, is now being diligently surveyed in the interest of the company, aided by the officers of Her Majesty's gunboat *Alert*, which we found anchored at Tilly Bay, Carlos III. Island, on our way through the strait.

"The entrance to Magellan's Strait on the western or Pacific side lies between Cape Pillar on Desolation Island, on the right, and 'Westminster Hall,' one of the foremost rocks fronting Queen Adelaide Island and Archipelago on the left. We proceeded along a broad channel—Cordova Channel—coasting Desolation and St. Inez Islands on our right, and on our left passing Parker Bay, at the entrance of Smyth Channel, and further on, steaming along King William Land and Croker Peninsula. Here the two coasts suddenly closed in, allowing a narrow sea-way through Long Reach, Crooked Reach, and English Reach, the width at some points scarcely exceeding three-quarters of a mile. The route goes on coasting the main land, along the Brunswick Peninsula, and doubles Cape Froward, the southernmost point of the South American continent. Fronting the Cape and the Peninsula, across the Strait, are Clarence and [illegible]vson Islands, and in the rear of them the much larger island

of Terra del Fuego, with all its archipelago, terminating with the rock-islet on which rises the redoubted Cape Horn.

"From Cape Froward the Strait turns up to the north, to Port Famine, Freshwater Bay, and Punta Arenas or Sandy Point, in which last-named locality the Chilians have founded a penal settlement, now a little colony, with 800 inhabitants, lying at 53° 53′ of south latitude—*i.e.*, nearer the Antarctic Pole than any other civilized community. From Punta Arenas the Strait bends to the north-west, a wide channel only contracting itself at 'Second Narrows' and 'First Narrows,' beyond which its shores gradually decline and end in a dead flat, where the channel blends its waters with the green waves of the Atlantic, its mouth lying between Cape Virgins in the north, and Catherine Point in the south. The whole length of the Strait, from its entrance at Cape Pillar to its outlet at Cape Virgins, is 320 miles, and the steamers usually employ 36 hours in its navigation.

"Even independently of the marvels of its accessory, Smyth Channel, the Strait of Magellan possesses beauties enough of its own to render it one of the most striking localities on the face of the globe. Like the Bosphorus, like the Strait of Gibraltar, like the Sound at Elsinore, and other gates in the world's highways, this Strait is so framed by Nature as to appeal for a variety of reasons even to the dullest imagination and to leave on the memory an impression that the subsequent sensations of the longest life will have no power to efface. We had had dark, windy, and, although not formidable, at least very uncomfortable weather on the outside, and as we made Cape Pillar before noon little could be seen of the highlands of Desolation Island, or of the outline of the opposite shore, now in a great measure wrapped in mist, to answer the description one had heard or read of this renowned passage. The mountains had the usual bare, rugged look common to the whole Andine region, only remarkable for the variety of vivid colours imparted to the rocks by the metallic and volcanic substances with which they are largely impregnated and commixed. The fogs deepened as we advanced, and became at last so dense that the captain deemed it advisable to stop at Felz Point, about 40 miles inside Cape Pillar, and there to lie at anchor for the night.

The gloomy reception we met with was no unusual occurrence; for the weather is, as a rule, dark, cold, and wet on this, the western side of the Strait, very nearly at all seasons of the year; while on the other side, beyond Cape Froward and Punta Arenas, the sky is not unfrequently clear and bright, and the atmosphere milder and drier than would seem natural in these high latitudes. But on the morrow, as the moon rose and the mist somewhat cleared, we were able to resume our journey towards two o'clock in the morning. We came to the narrow windings of Long Beach, and here, as the day dawned, in spite of the spitting and at times even pelting and blinding rain, we went through a succession of amazingly grand and weird scenery.

"We were now nearing the end of summer, the early days in March corresponding to our September, when the sun's action for the last three months might be expected to have cleared the mountains of their wintry encumbrance. But the scenery on both sides the narrow passage still wore a Polar look; the glaciers slid down in perpendicular sheets from the brow of the hills to the water-edge; the water-falls in the glens seemed to hang frozen in the air like crystal columns, and, although neither the wind nor the storm reached us, we could see far up on the mountain summits, when a rift in the clouds laid them bare, the surface all covered with fresh-fallen and thick-falling snow, drifting into wreaths and heaving into heaps as it flew eddying before the blast. But snow and ice and angry gales are not the only elements of grandeur and beauty in this unique scenery. Travellers who cross the Strait in the depth of winter, or, better, on the early outbreak of spring, may well descant on 'glaciers 15 and 20 miles in length,' 'on immense masses of ice, sometimes larger than a ship, continually breaking off and falling into the waters with the noise of thunder, sending huge waves across to the opposite shore, and sometimes completely blocking up the channel.' Phenomena like these, though they throw 'even the wonders of Norway and Switzerland into comparative insignificance,' may at any time be met with far up in the Polar regions, where the sublime of all that ice and snow is apt to border on the monotonous. But here the peculiar charm lay in the contrast between the hoary winter on the

brow of the hills and the genial warmth, the rich moisture, the rank vegetation on their sides along shore. And this juxtaposition of ice and flowers, of snowy summits and glassy slopes, of blue glaciers bordering on green meadows and yellow cornfields, and of icicles hanging on the branches of budding trees—could be seen to the best advantage at this period which precedes the fall of the year, while Nature is still going through every phase of teeming life, and wavers on the brink of that severe season in which the deadening chill of the south wind will bury all the struggling year's growth under its funeral pall. At every step, as we wound through the narrow reaches of the channel, and we found ourselves hemmed in by the mountains closing around us on all sides, as in a succession of Alpine lakelets without visible outlets; as we passed many an islet, a cove, or inner channel, at a loss how to trace out our perplexing route, as the fleeting glimpses of sunshine lit up the landscape with prismatic tints, and the rents in the clouds laid bare the huge mountains, exhibiting them in a kind of dim phantasmagoria, peak above peak and range behind range, while along shore, almost within the reach of the limit of perpetual snow, the green sward on the slope of Cape Froward, and the wood-clad hills and ripening crops of Freshwater Bay and Punta Arenas, basked in a blaze of moonlight, we scarcely knew whether we were more grateful to the fitful weather for what we were allowed to see or for what we were left to imagine.

"We must also avow that we heard nothing of the 'shouts and hoots' that told other travellers of the dangerous neighbourhood of wild Indians lurking on the shores. Of long-robed Patagonians and stark-naked Fuegians, of whom we had read such interesting descriptions, we saw no trace. What awed and almost appalled us at night, as we rode at anchor, once at Felz Point, and again at Punta Arenas, was the solemn stillness of that blank solitude, its silence as striking as its darkness, and strangely contrasting with the flights of birds, the shoals of fishes, of seals, and other marine monsters with which the Strait, like other great channels, is all alive in the daytime. We were in no dread of being boarded by scalping Indians in their canoes; our danger only arose from the boats of Yankee sharpers

at Sandy Point, who covered our deck with guanaco hides and rugs of ostrich feathers, and drove as hard bargains in selling such trumperies to us as they doubtless had driven with the helpless natives with whom they had 'traded' for them. Away from Punta Arenas and its dependencies there is hardly any trace of habitation for hundreds of miles, for the white man has as yet hardly pitched his tent on the Strait, and the native tribes, now fast dying off, have withdrawn to the interior, shunning all intercourse with their destroyers. Owing to repeated sanguinary mutinies, Punta Arenas has almost ceased to be a penal settlement. The rogues who again and again broke from the penitentiary are mostly at large, and it may be a prejudice, but it seemed difficult to us, as we looked into the faces of the mob that crowded around us, to distinguish which of them might a few years ago have been the prisoners and which the gaolers. At Punta Arenas we shipped 40 large barrels of sealskins, the only important article of export trade in the colony.

"The progress of steam navigation has done away with a vast amount of the terrors with which the imagination of past ages peopled the Magellanic Strait. Not a little danger, however, still lurks in the many rocks and breakers with which its waters are strewn, and the position of which has not yet been quite satisfactorily set down in the charts which the captains of the Pacific Company's steamers are constantly revising and rectifying for themselves. The thick growth of kelp, an aquatic plant which has its roots in these rocks and springs up from their depths to the water's edge, seems intended by Providence as a sufficient warning—a kind of natural buoy—to such as keep a sharp look-out in the day-time, but at night, and especially in the foul weather which so often prevails, the pilot must steer at haphazard, for there is no beacon to show the way. From Valparaiso down the west coast, and across the Strait, and up the eastern coast to Monte Video, for a distance of 1,923 miles, there are only three lighthouses—on Quiriquina Island, at Talcahuano near Concepcion, where Chili has chosen the site for a naval station; at Point Galora, near Valdivia; and at Punta Arenas. Half-a-dozen lights in the Strait, both entrances and at some of its most important turnings, would

not be superfluous. The Chilian Government has hitherto excused itself on the plea that south of Port Montt it was 'No man's land.' But now it has a colony in the extreme south, and claims the sovereignty of the Magellanic territory, all Terra del Fuego and Patagonia included, it seems only too natural to expect something to be done by it for the safety of the seamen to whose bravery Chili is indebted for so much of the prosperity accruing to it from its coasting and foreign trade. The Egyptian darkness in which a nation aspiring to take rank among enlightened nations suffers its shores to be plunged has cost the Pacific Company two of its most splendid steamers—the *Illimani*, lost on the Isle of Mocha, on the coast of Arauco, and the *Santiago*, wrecked at port Mercy, within the Strait, where we still saw its shattered hulk on the strand as we passed.

From Cape Virgins, at the outlet of Magellan's Strait, a five days' voyage brought us to Monte Video, at the mouth of the River Plate. From Monte Video there are 11 lines of steamers of different nations, weekly and semi-weekly, conveying passengers up to the ports of Brazil, and across the Atlantic to all the coasts of Western Europe.

THE PUBLICATION OF NOTICES TO MARINERS.

ON one of the last days of the recently-expired session of Parliament, the President of the Board of Trade was asked whether any means were taken beyond placing a notice on the general notice board at the Custom House, for the information of shipowners and masters clearing from British ports, of any change in the lights, or of changes in the charts; and, if not, whether adequate notice would be given in future?

In reply to this question, Mr. Chamberlain said: The practice of the Board of Trade is to send notifications of changes in lights, &c., and notifications in respect of charts and other matters affecting navigation, to the Committee for Managing the Affairs of

Llo y Point, who covered on *Shipping and Mercan* we should Tl trich feathers, ar Department of the Admiralty is in carrying tin ies to us ed with, and that department, if it y valuable de , p pares and issues a Notice to Mariners. U's service. of notice from the Admiralty the Board of ers are cop to the Registrar-General of Shipping and Seamen and to various local Marine Boards. In cases where the notifications appear foreign language translations are made.

T thus raised is undoubtedly one of some importance an worthy we think of a little more comment than that which it has gained through the medium of a parliamentary question addressed by a jaded member to a worn-out minister at the fag-end of a session.

The President of the Board of Trade replied on behalf of his own Department only, but our readers are probably well aware that it is not from the Board of Trade that the bulk of notices to mariners are issued. The Admiralty, the Trinity House Corporation, the Commissioners of Irish and Scotch Lighthouses, and some other bodies also notify changes in lights for the information of mariners, and as regards the manner in which it is done by these several authorities, the President of the Board of Trade gave no information to the honourable member who enquired on the subject.

A few remarks on the system generally adopted for making the nautical public acquainted with the new lights established and the changes made in those already existing will be serviceable. We will first note what is done by the Admiralty. Reciprocal intimations of new lights and alterations are made between all civilised nations, and those received by our Government are handed over to the Hydrographic Department of the Admiralty, which Department has a sufficient number of copies printed to supply all H.M. ships; copies are also sent to public bodies connected with the Mercantile Marine, such as the Trinity House, Lloyd's, &c., to the various chart publishers in London, and to the editors of nautical publications. The copies sent to the Trinity House are reprinted by that Corporation "for the general information of mariners," and, in the form of handbills, are sent round to the Custom Houses

public m... ...ief ports to be posted ...ernment has hitherto ex... ...ay officials, ...them; and they are otherwise ...was 'No man's l... ...is- But su...h the object of making their substanc... and ... ...wn rights w...se interested in such matters. ... ...

...Besides the re-issue of notices received from th... ...ro- grapher of the Admiralty, the Trinity House Corporat... has announcements of its own to make public concerning the l...hts, buoys, and fog-signals on the coasts of England ... Wales. These announcements are more extensively adve... ... ...this country than those concerning foreign lights, &c. The... ...are widely distributed in the form of handbills at all the ports, are sent to be posted up at Lloyd's, and other public places frequented by nautical men, are advertised in the London daily papers and chief nautical publications, are sent to all the pilots whose waters would be affected by the change notified, and are forwarded also to all the Foreign Consuls in London for transmission to their respective Governments. Copies are also sent to the Admiralty for the information of H.M. ships and to other public departments, as well as to the several chart publishers in London. A similar system of publication is adopted by the Scotch and Irish Lighthouse Boards. We believe that on application, a copy of any notice issued by any one of these Boards may be obtained, and also that the mariner may learn all the changes made within a given period.

All this is very well, and it does not seem possible to find fault with the system adopted. We think it necessary to state the practice in detail in order that our readers may know how to ascertain for themselves what alterations have been carried out. In justice to ourselves, however, we desire to point out that ever since its establishment forty-nine years ago, a special feature of the *Nautical Magazine* has been a tabulated statement, under the heading "Nautical Notices," concerning new lights and changes made in all parts of the world during the preceding month. We are in communication with most foreign Governments and obtain direct information which we are able to publish at times before it reaches the official channels. Carefully indexed at the end of the year, our pages give a trustworthy and complete record of all changes which have taken place in the twelve months.

But there is another phase of this question to which we should like to advert. A great deal of public money is spent in carrying out marine surveys in various parts of the globe, and very valuable are the results obtained by the officers employed in this service. New lines of trade are enabled to be opened up, dangers are indicated, the positions of places determined with accuracy, and the general results embodied in carefully-constructed sailing directions. Now to our thinking these records should be as readily accessible to the mariner as are the notices concerning lights, buoys, &c., but we fear, as a matter of fact, that merchant captains have considerable difficulty in obtaining information of this character. It is true that the Hydrographic Department of the Admiralty publishes the results obtained in the form of a Hydrographic Notice, but the distribution of these white pamphlet notices appears to be very limited, and confined chiefly to the vessels of Her Majesty's Navy. We think there ought to be greater facilities afforded to the merchant seaman in obtaining the information contained in these publications; in many instances it would be invaluable to enterprising marine traders. It may perhaps be said that the volumes containing the directions for all parts of the world are published by the Admiralty and can be purchased. This is true no doubt, but the price is generally very high, and as a matter of fact the book seldom contains the latest information; it is the latest information which the mariner usually requires, and this, under present arrangements, he has the greatest difficulty in obtaining. The Admiralty are good enough to furnish us with copies of the hydrographic notices, and when it happens that the new matter concerns some well-known or much-frequented locality we reprint it, but usually the length of the publication is far beyond the space available in our pages. We endeavour to inform our readers by publishing each month a list of the hydrographic notices issued since our preceding number, but are unable to say where they may be obtained for either love or money. Possibly an application to the Lords Commissioners of the Admiralty might be successful, but the delays of routine and the desire which appears to exist in some quarters to withhold from the public all knowledge gained by the expenditure of

public money, and to keep it as the sacred property of a few select officials, would, probably, very soon dishearten the applicant.

But surely the Mercantile Navy has in this respect at least equal rights with the Royal Service. The latter would probably not exist if the former had not been the means of finding the money. We hope therefore some system may be adopted by which the hydrographic information so laboriously collected, may be placed within easy reach of the merchant service generally, to the great advantage of British trade and enterprise.

In a previous number we called attention to an announcement printed on the cover of the Annual List of Lights (a list containing also full directions for making the lights serviceable for the purposes intended), published by the United States Lighthouse Board, to the effect that a copy of the list would be sent free of charge to any shipmaster on application to the office of the Lighthouse Board at Washington. We do not desire to make the obvious comment which this action of a foreign Lighthouse Board suggests, but in connection with our previous remarks we would commend it to the consideration of the authorities in this country.

BRITISH AND FOREIGN SAILORS' SOCIETY.

TWO Prizes, of £100 and £50, are offered through the medium of the above Society for the two adjudged essays on "The British and Foreign Mercantile Marine, how best to improve, afloat and ashore, the *Material*, *Mental*, and *Moral* well-being of our Sailors."

The following Vice-Presidents of the Society have kindly promised to give £25 each towards the prizes :—Thomas Brassey, Esq., M.P., *Sunbeam ;* J. Herbert Tritton, Esq., Chairman, General Steam Navigation Company ; Ed. Rawlings, Treasurer, Religious Tract Society ; James Clark, Esq., Editor of the *Christian World ;* James Anderson, Esq., "Orient Line ;" John Cory, Esq., Cardiff.

The following gentlemen, representing the Churches, the shipowners, and the sailors, have kindly consented to act as

Adjudicators:—The Right Rev. Bishop Claughton, D.D., Archdeacon of London; The Rev. Donald Fraser, D.D., Moderator English Presbyterian Church; The Rev. E. Ebenezer Jenkins, M.A., Sec. Wesleyan Missionary Society, and President of the Conference; The Rev. Enoch Mellor, D.D., Halifax; J. Herbert Tritton, Esq., Chairman, General Steam Navigation Company; J. W. Janson, Esq., Lloyd's; Captain Wiggins, F.R.G.S., late of the Board of Trade, Arctic Explorer, &c.

The conditions are:—

1. That the two best Essays must be adjudged *worthy* of being published, or the prizes cannot be awarded.

2. That the successful Essays are to be the property of the British and Foreign Sailors' Society, to be used for the interests of the Mercantile Marine.

3. That the Essays are to be conceived in a *broad*, *international*, and *interdenominational* spirit. (1) To show what has already been accomplished, and by what means, for the material and spiritual benefit of sailors during the *nineteenth century*. (2) They should give the state of the Mercantile Marine *to-day*. (3) Point out the most effective means to be employed in view of the *future*.

4. Bring out in strong relief the position of seamen in the Old and New Testament, Christ's relationship to the sea, and the part destined by God for seamen to play in these last days, in cementing the brotherhood of nations, and being the pioneers of the great mission enterprises of the world.

5. The Essays should in a faithful but generous manner show the responsibilities of legislators, communities, churches in general and Christians in particular, especially those residing in our seaports at home and abroad; also, of those directly interested in sailors, as merchants, underwriters, and shipowners.

6. Also give an epitome of practical suggestions for Christian officers and men for aggressive religious work afloat and abroad. Giving prominence to *Temperance*, and *Thrift*, *Culture*, and *Conversion*.

7. The Essays to be written only on one side of the paper, and not to exceed in length 200 pages of the large type in *Chart and Compass Sailors' Magazine*, published by S. W. Partridge & Co.,

London, or can be ordered of any bookseller, or the address below.

Writers to distinguish their Essays by a motto, which should also be written outside sealed envelopes, containing their names and addresses, to be sent with the Essays before the 31st August, 1881, to THE ADJUDICATORS, British and Foreign Sailors' Society, Sailors' Institute, Shadwell, London, E.

MERCHANT SHIPPING (CARRIAGE OF GRAIN) ACT, 1880.

AN Act to provide for the safe carriage of Grain Cargoes by Merchant Shipping [7th Sept., 1880].

Be it enacted by the Queen's most excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

1. This Act may be cited as the Merchant Shipping (Carriage of Grain) Act, 1880, and shall be construed as one with the Merchant Shipping Act, 1854, and the Acts amending the same, and together with those Acts may be cited as the Merchant Shipping Acts, 1854 to 1880.

2. This Act shall come into operation on the 1st day of January, 1881 (which day is in this Act referred to as the commencement of this Act).

3. Where a grain cargo is laden on any British ship, all necessary and reasonable precautions (whether prescribed by this Act or not) shall be taken in order to prevent the grain cargo from shifting. If such precautions have not been taken in the case of any such ship, the master of the ship, and any agent of the owner who was charged with the loading of the ship or the sending her to sea, shall each be liable to a penalty not exceeding £300, and the owner of the ship shall also be liable to the same penalty, unless he shows that he took all reasonable means to enforce the observance of this section and was not privy to the breach thereof.

4. Where a British ship laden with a grain cargo at any port in the Mediterranean or Black Sea is bound to ports outside the Straits of Gibraltar, or where a British ship is laden with a grain cargo on the coast of North America, the following precautions to prevent the grain cargo from shifting shall be adopted; that is to say—

(*a.*) There shall not be carried between the decks, or, if the ship has more than two decks, between the main and upper decks, any grain in bulk, except such as may be necessary for feeding the cargo in the hold, and is carried in properly-constructed feeders.

(*b.*) Where grain (except such as may be carried in properly-constructed feeders) is carried in bulk in any hold or compartment, and proper provision for filling up the same by feeders is not made, not less than one-fourth of the grain carried in the hold or compartment (as the case may be) shall be in bags supported on suitable platforms laid upon the grain in bulk: Provided that this regulation with respect to bags shall not apply—

(i.) To oats, or cotton seed; nor

(ii.) To a ship which is a sailing ship of less than 400 tons registered tonnage, and is not engaged in the Atlantic trade; nor

(iii.) To a ship laden at a port in the Mediterranean or Black Sea, if the ship is divided into compartments which are formed by substantial transverse partitions, and are fitted with longitudinal bulkheads or such shifting-boards as hereafter in this section mentioned, and if the ship does not carry more than one-fourth of the grain cargo, and not more than 1,500 quarters, in any one compartment, bin, or division, and provided that each division of the lower hold is fitted with properly constructed feeders from the between decks; nor

(iv.) To a ship in which the grain cargo does not exceed one half of the whole cargo of the ship, and the rest of the cargo consists of cotton, wool, flax, barrels or sacks of flour, or other suitable cargo so stowed as to prevent the grain in any compartment, bin, or division from shifting.

(*c.*) Where grain is carried in the hold or between the decks,

whether in bags or bulk, the hold or the space between the decks shall be divided by a longitudinal bulkhead or by sufficient shifting boards which extend from deck to deck or from the deck to the keelson, and are properly secured, and, if the grain is in bulk, are fitted grain-tight with proper fillings between the beams.

(*d.*) In loading, the grain shall be properly stowed, trimmed, and secured.

In the event of the contravention of this section in the case of any ship, reasonable precautions to prevent the grain cargo of that ship from shifting shall be deemed not to have been taken, and the owner and master of the ship and any agent charged with loading her or sending her to sea shall be liable accordingly to a penalty under this Act. Provided that nothing in this section shall exempt a person from any liability, civil or criminal, to which he would otherwise be subject for failing to adopt any reasonable precautions which, although not mentioned in this section, are reasonably required to prevent grain cargoes from shifting.

5. The precautions required by this Act to be adopted by ships laden with a grain cargo at a port in the Mediterranean or Black Sea, or on the Coast of North America, shall not apply to ships loaded in accordance with regulations for the time being approved by the Board of Trade; nor to any ship constructed and loaded in accordance with any plan approved by the Board of Trade.

6. Before a British ship laden with grain cargo at any port in the Mediterranean or Black Sea, bound to ports outside the Straits of Gibraltar, or laden with grain cargo on the coast of North America, leaves her final port of loading, or within 48 hours after leaving such port, the master shall deliver or cause to be delivered to the British Consular Officer, or, if it is in Her Majesty's dominions, to the principal Officer of Customs at that port, a notice stating—

(1.) The draught of water and clear side, as defined by Section 5 of the Merchant Shipping Act, 1871, and Section 4 of the Merchant Shipping Act, 1873, of the said ship after the loading of her cargo has been completed at the said last port of loading;

(2.) And also stating the following particulars in respect to the grain cargo; namely,

(*a.*) The kind of grain and the quantity thereof, which quantity may be stated in cubic feet, or in quarters, or bushels, or in tons weight; and

(*b.*) The mode in which the grain cargo is stowed; and

(*c.*) The precautions taken against shifting.

The master shall also deliver a similar notice to the principal Collector or other proper Officer of Customs in the United Kingdom, together with the report required to be made by the Customs Consolidation Act, 1876, on the arrival of the ship in the United Kingdom. Every such notice shall be sent to the Board of Trade as soon as practicable by the officer receiving the same. If the master fails to deliver any notice required by this section he shall be liable to a penalty not exceeding £100. Provided always, that the Board of Trade may, by notice published in the *London Gazette*, or in such other way as it may deem expedient, exempt ships laden at any particular port or any class of such ships from the provisions of this section.

7. Any master of a ship who in any notice required by this Act wilfully makes any false statement, or wilfully omits any material particular, shall be liable to a penalty not exceeding £100.

8. For the purpose of securing the observance of this Act, any officer having authority in that behalf from the Board of Trade, either general or special, shall have the same power as an Inspector appointed under the Merchant Shipping Act, 1854, and shall also have power to inspect any grain cargo, and the mode in which the same is stowed.

9. Every offence punishable under this Act may be prosecuted summarily, and every penalty under this Act may be recovered and enforced summarily in like manner as offences and penalties under the Merchant Shipping Act, 1854, and the Acts amending the same.

10. For the purposes of this Act—The expression "grain" means any corn, rice, paddy, pulse, seeds, nuts, or nut kernels. The expression "ship laden with a grain cargo" means a ship carrying a cargo of which the portion consisting of grain is more one-third of the registered tonnage of the ship, and such hall be computed, where the grain is reckoned in measures

of capacity, at the rate of 100 cubic feet for each ton of registered tonnage, and where the grain is reckoned in measures of weight, at the rate of two tons weight for each ton of registered tonnage.

11. Section 22 of the Merchant Shipping Act, 1876, is hereby repealed as from the commencement of this Act. Provided that any offence against that section committed before the commencement of this Act may be prosecuted, and the penalty recovered and enforced, in like manner as if the said section had continued to remain in force.

LIQUID FUEL FOR STEAMERS.

THE following communication has been published in the *Journal of the Society of Arts*:—

"Regarding the use of petroleum—or rather the refuse of petroleum—as fuel, on board the *Cesarewitch*, Russian mail steamer, on the Caspian Sea, a notice of which appears in *Journal* of July 30th, it may be interesting to some of our readers to know, that in 1868, a small yacht was steaming about the Solent, on board which liquid fuel, in the shape of common creosote, was the only fuel used. She was the property of a small private company, organised under the Limited Liability Act, for developing a method of utilising mineral oils as steam fuel, under a patent taken out in the joint names of the late Mr. Sim and myself. Previous to my taking her round to Southampton, the yacht had been some two or three months in Woolwich Dockyard, where the Sim and Barff method was thoroughly tested by the officials connected with the steam department, and a report made to the Admiralty, the substance of which, however, I was never made acquainted with; but I have reason to suppose that it was a tolerably satisfactory one, as some time afterwards I had a communication from the chief engineer, informing me that his estimates for certain experiments with our method, which I had suggested, should be made in the boilers of H.M. gunboat *Teazer*, had been approved and passed. Meanwhile, accident had dis-

covered a simpler method than that of Sim and Barff. During the trials, when in the dockyard, the apparatus had not worked quite so well as we could have wished. The yacht was made fast to the wharf, and the engines kept going continuously, but we had barely been able to keep them up to full speed. The boiler was of novel construction, by Amos and Anderson, afrer a design of my own. The late Admiral McKillop, who kindly assisted me, was of opinion that it was the fault of the boiler, and we had some idea of putting in another one. On leaving Woolwich, we were only able to generate sufficient steam to maintain about half-speed. After proceeding some two or three miles, all at once the boiler commenced to generate steam, not only sufficient to maintain full speed, but to blow off at the safety-valve, regulated to 60 lbs. pressure, at a rate which might almost be called alarming. The next day when all was cooled down, and we were able to investigate the cause of the great improvement, it was discovered that a large, and what we thought an important, portion of the apparatus had been melted, leaving only a jet of steam and oil spray, such as that described in your *Journal* as being used on board the *Cesarewitch*, subsequently this was found to be, if not quite so economical, the most practical method. On consideration, the directors deemed this fatal to the Sim and Barff patent. Nor were they able to see their way to taking out a new one, which, they were advised, had a fair prospect of being maintained. Much to my regret, the efforts and resources of the company were devoted to develop a method of carburetting coal-gas by means of hydro-carbons.

"After keeping the yacht a short time at Rochester—during which she was inspected by Mr. Allen, of the P. and O. Company—I took her to Southampton. During part of the time, I lent her to the late Commodore Goodenough, then in command of the *Minotaur*, flag ship to the channel squadron. I have a letter written by him, in which he expresses a high opinion of the method; also his conviction that eventually liquid fuel would be that of the Navy.

"By a log that was kept, I find that, during the time we were using this fuel, we steamed upwards of two thousand miles without a single hitch of any sort.

"My experience of liquid fuel enables me to fully endorse what is said in the notice in your *Journal* concerning what is done on board the *Cesarewitch*, viz., 'that it has the advantage of requiring no stoking, as no ashes are produced; that, by turning down the flame to the required degree, steam can be kept at the pressure necessary for immediate starting, without the tedious and more wasteful process of "banking;" and that such a method is "invaluable to cruisers." Further, that it is—when the steam and oil are properly regulated—entirely smokeless; that its cost does not exceed that of coal, and is more economical of space; that there is less fear of explosion or spontaneous combustion, as whatever gas might be generated in the tanks would be on the surface, and could easily be allowed to escape into the open air.' When I saw that such a man as Admiral Selwyn had taken up the subject, I made sure that the adoption of liquid fuel into the Navy would have taken place long before this. The difficulties made by the Marine Insurance Companies—the vague fears of anything under the name of mineral oil on the part of marine engineers—are much against its first introduction by the Mercantile Navy.

"Probably the simplicity of the best method, and the number of patents relating to liquid fuels which have lapsed, rendering it difficult to take one out which could be maintained, together with the expense which must attend its first introduction, may account for the apparent neglect of so important a subject. I am convinced it is not on account of the impractibility of using liquid fuel, for it has long been in use at the creosoting works of Messrs. Burt, Bolton, and Heywood, the large timber merchants, as well as in many places in the United States.

"ARTHUR BARFF.

"Merton-cottage, Merton, Surrey,
"August 10th, 1880."

CROZET ISLANDS, SOUTH INDIAN OCEAN.

THE following information, the result of a visit in March, 1880, to Crozet islands, for the purpose of relieving shipwrecked crews, has been derived from the report and remarks of Captain J. N. East, R.N., and Navigating Lieutenant G. W. Balliston, H.M.S. *Comus*. *Variation* 33° *Westerly in* 1880 :—

Hog Island, the summit of which is always covered with snow, is about 2,000 feet high, and makes in a number of small peaks. The western side is precipitous; the east side slopes down to the sea. There is no landing on the western side, at any time, on account of the heavy swell which is always breaking there. On the eastern side a landing can be effected at several places, but seldom without difficulty, as the swell sets round the north and south points of the island.

The best landing is about 2¼ miles from the large rock off the north-east point. To a vessel approaching from the northward the anchorage is easily recognized as it is off the first bluff southward of the north point. The landing place is in a small cove on the south side of the bluff, and is protected by some rocks at the entrance. The *Comus* anchored in 12 fathoms, good holding ground, in a position about half a mile from the shore, and about half a mile north of the landing place mentioned. This is said to be a safe anchorage in all prevailing winds; several large whalers having laid there in the winter months in safety. During the three days the *Comus* remained at this anchorage, the landing, with the exception of the night of the vessel's arrival, was difficult.

Provisions for the use of shipwrecked people were landed and a depôt formed in the cove. In this cove (the ruins of an old hut still standing) the pilot of the *Comus*, whose services had been engaged at the Cape of Good Hope, had lived some years before. Hog island is probably seldom visited; there were no signs of any people having been there since the pilot left 10 years before; and during a connection of some 20 years with the Crozets, he saw only one vessel pass while there.

Hog island is swarming with sea elephants, seals, rabbits, duck, teal, albatross, penguin, and other birds. To shipwrecked people the skin of the sea elephant would form a good covering; and the tongues, fins, and kidneys of these enormous animals are excellent food. Fresh water is abundant.

Position.—The mean of several good observations taken at Hog island places the island 13 miles N.W. of the position given originally on the authority of Lieutenant Fournier, French Royal Navy, 1838. The position of the *Comus'* anchorage as thus determined is lat. 46° 6′ 10″ S., long. 50° 16′ 5″ E.

Apostles Islands form a group of two small islands one or 1½ miles long, and several pinnacle rocks of 50 to 400 feet in height with a few outlying rocks to the south-west. There are deep channels between some of these, through which whaling schooners are said to have passed. The north-east island, the largest, is about 850 feet high, its north-east point being in lat. 45° 56′ S., long. 50° 21′ 30″ E. (approximate) or about 14 miles N.W. of the position formerly supposed. The south-east shore appears to be clear of danger and steep-to. The *Comus* steamed two or three times up and down it, within half a mile of the rocks, sounding, but obtaining no bottom with 15 fathoms of line. The north-western shore should be approached with caution as there are said to be several sunken rocks off it. There are one or two spots where landing can be effected with difficulty when the water is smooth. The cairn, built by the shipwrecked people landed from the *Strathmore* in 1875, can be plainly seen from a long distance.

Penguin Island bears S. by W. distant about 22 miles from the anchorage off Boat cove, Hog island. It is about 1,000 feet high, has a barren and volcanic appearance and is quite inaccessible. There is a rock about 250 feet high off its north-east point, appearing as if it had been cut off from the island.

Heroine Breaker is not so extensive as formerly supposed; it is said to be only one rock which always breaks. It lies in lat. 46° 18′ N., long. 50° 23′ E., or 12 miles N.W. of the position assigned by Lieutenant Fournier.

Possession Island.—On this island was seen a considerable quantity of snow, the melting of which keeps the lowlands and

valleys always under water, and forms in some par deep bog covered with emerald green.

American Bay.—On the northern side of Possession land there are t' ree anchorages, with apparently easy landing. The *Comus* ancl .ed in 5 fathoms in a bay known to the sealers as American ba which is situated about 7 or 8 miles to the south-east of Dark hea The bay is easily recognized; on the east side of the entrance there is a red cliff: on its western side a conspicuous rock near the shore. The anchorage is about half a mile in extent between the kelp, and has 5 to 7 fathoms water. A patch of kelp extending from the eastern side about half way across the entrance, has 6 fathoms close to its edge, and forms a good protection from the sea. Off the head of the bay extends another patch of kelp, having a depth of 5 fathoms at its outer edge.

American bay is described as a smooth semi-circular harbour, affording excellent anchorage; open to winds from E. by N. to North, but sheltered from all prevailing winds. It is considered to be superior to Ship cove (Navire bay) for a landing place, as landing could always be effected here. A depôt of provisions was formed here for the use of shipwrecked people. The provisions were landed from the *Comus* without difficulty and placed in shelter huts in the south-east corner of the bay about 100 yards from the shore. The remains of several huts used by whalers were found in American bay; but these fisheries have been abandoned, and no one had apparently landed during a period of some years.

The beaches swarmed with sea elephants; a few duck were shot, and guinea fowl were seen. The Kerguelen cabbage abounds, also an edible plant named red root, on which it is said life might be sustained.

East Island is about 4,000 feet high and always covered with snow. The shores are steep, but there are several little bays on the north and east sides, and numerous waterfalls, some of which are of considerable volume, and fall over the cliffs into the sea. East island was estimated to be 10 miles distant from Possession, or about 2 miles nearer than formerly supposed. It has several good anchorages on its north and east sides, which from the

appearance of the vegetation growing close to the water's edge can seldom be washed by heavy seas. Kelp was seen off the east point of East island. The ruined huts of whalers we [illegible] standing in North-east bay.

Currents.—The *Comus*, during several days previous [illegible] arrival at Crozet islands, from the Cape of Good Hope, experienced currents setting to the northward and N.E. at the rate of [illegible] miles a day. The winds during this time were from various directions, but had no great force. The current is said to set generally to the N.E. among the Crozet islands.

Caution.—Captain East recommends that in the event of shipwreck in the vicinity of these islands, the boats should immediately make either for the east sides of Hog or Possession island, or for the north side of East Island, where they may find landing and plenty of food.

BOOKS RECEIVED.

Deep-Sea Sounding and Dredging. A Description and Discussion of the Methods and Appliances used on Board the Coast and Geodetic Survey steamer *Blake*. By Chas D. Sigsbee, Lieut.-Commander, United States Navy, Assistant in the Coast and Geodetic Survey. Washington: Government Printing Office. 1880.

The matter contained in this admirably got-up work is probably familiar to most of the surveying officers of the British Royal Navy, but we are not aware that information of a similar character is collected together to form a comprehensive volume, and published in this country for the benefit of those who wish to possess such knowledge. The Americans set us a commendable example in regard to the publication of technical information; they have no absurd official restrictions operating to prevent or limit the dissemination of knowledge: in many cases they provide special means for making public the results gained by their naval officers, whom they encourage to make reports by printing them at the public expense if adjudged to be worthy.

Lieut. Sigsbee, the author of the work now before us, appears be gifted with an energetic spirit, and a mechanical genius his fellows. It is quite interesting to read how cleverly he ves and adapts apparatus for his purposes, and in this respect n ubt many of our officers would be able to find hints of some value. The chief duty for which Lieut. Sigsbee was detailed, was surveying work in the Gulf of Mexico, more particularly with reference to the problem of the Gulf stream. The work performed by this officer is spoken of in the highest terms by the Superintendent of the United States Coast and Geodetic Survey, but the details of the results of the survey are not yet published, the volume before us being entirely devoted to a description of the methods adopted on board the *Blake* in sounding and dredging.

It appears that in this survey steel pianoforte wire, as recommended by Sir William Thomson, was entirely employed, and Lieut. Sigsbee has much to say in its favour. As regards Sir Wm. Thomson's machine for paying out the sounding wire, the author made sundry improvements in it, and devised additional apparatus to relieve the strain on the wire during rapid and violent movements of the vessel.

The volume is enriched by carefully executed photographs and diagrams, and altogether is a valuable contribution to the literature of deep-sea sounding.

General Report of the Operations of the Marine Survey of India for the Year 1878-79; prepared for submission to the Government of India by Commander A. Dundas Taylor (late I.N.), F.R.G.S., Superintendent of Marine Surveys. Calcutta. 1880.

This is a complete account of what has actually been done in the Marine Survey Department of India since the publication of the previous Report, and embraces a period of eighteen months, extending from April, 1878, to September, 1879. It reviews the season's work under the heads of (1) remarks on the inspection of several harbours; (2) the surveying operations of the season, and those anticipated during the next five years; (3) the work executed in the drawing branch and office; and finally refers to official changes and the good services of the officers attached to the

Department. During the period embraced in the Report, besides the new Charts issued, 5 Hydrographic Notices and 47 Notices to Mariners relating to new lights, buoys, and newly-discovered dangers, have been published; making a total since April, 1875, when the work of the Department commenced, of 58 new Charts compiled, 20 Hydrographic Notices, 109 Notices to Mariners, 3 Returns of Wrecks and Casualties in Indian Waters (1876-78), 4 editions of the List of Lighthouses and Light-vessels in British India, and other publications for the benefit of the nautical community.

The work appears to be done thoroughly and well, and as quickly as the number of officers and officials will permit; nor are the expenses as great as might be expected considering the work done. It is remarked that the owners and masters of the native craft are now beginning to realize the value of the charts, and purchasing them and the various publications in goodly numbers. We are also glad to find that the Superintendent, amongst other engagements, is occupied in preparing a corrected edition of the "West Coast of Hindostan Pilot," and also the first edition of an "East Coast of Hindostan and Bay of Bengal Pilot"—the necessity for which has long been felt by navigators in those seas, as so many ports have of late years opened up, of which no mention whatever is made in any sailing directory extant.

The Appendices are also excellent contributions to nautical science, particularly that on Tidal Observations in India and the necessity of one definite datum value for all Indian charts, since the diurnal inequality, at least as regards height of water, is large; and the *amount* of rise and fall is the important question to the pilot and navigator.

The Superintendent is properly hard on the opinion of gentlemen who seem to have a voice in lighthouse matters, but have no special knowledge of the subject.

CORRESPONDENCE.

CORTON LIGHT, EAST COAST.

To the Editor of the "Nautical Magazine."

Sir,—As a constant reader of your valuable journal, and seeing so many alterations of lights on our coasts, I am disappointed that there is no proposed improvement in the light shown from the Corton light-vessel, which I with many others think is very much wanted. We have to navigate a distance of over fifteen miles of dangerous sands, and have to alter the course two points after running from the Newarp, a distance of five miles; and then we have no sure guide but the Corton, a light that cannot be seen in hazy weather more than two miles. Many a time Lowestoft light cannot be seen, when the Newarp can be seen four or five miles. Were there such a good light at the Corton, it being about midway of those dangerous sands, it would be a safe guide, and one that could be depended upon; as it is at present it is no use whatever as a guide to keep off the sands. I myself find those sands the worst part of our coast to come round in hazy weather, and as badly lighted.

In sending this to you, I am in hopes, by the interest you take in anything that is beneficial to safe navigation, I may soon hear of an alteration taken place.

I am, Sir, your obedient Servant,

JAMES BLYTH,

Master of s.s. *William Hunter.*

London, September 12th, 1880.

Medway Pilotage.—By recent Orders in Council a new class of men may be licensed to pilot vessels which are exempt from compulsory pilotage, up the Medway between the Nore and Rochester, and for so doing both the existing pilots and the men about to be licensed may receive a lower rate of remuneration than that demandable by law in respect of such vessels. It is believed that this change will be of considerable benefit to the increasing trade of the Medway.

TIDE TABLES FOR OCTOBER, 1880.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M.	London Bridge. P.M.	Hull. A.M.	Hull. P.M.	North Shields. A.M.	North Shields. P.M.	Leith. A.M.	Leith. P.M.	Devonport. A.M.	Devonport. P.M.	Dover. A.M.	Dover. P.M.	Weston-Super-Mare. A.M.	Weston-Super-Mare. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
F	1	—	0 3	4 13	4 36	1 15	1 35	0 8	0 29	3 10	3 34	8 48	9 11	4 21	4 47
S	2	0 25	0 47	4 56	5 13	1 54	2 12	0 49	1 7	3 57	4 19	9 31	9 49	5 10	5 30
S	3	1 5	1 24	5 29	5 47	2 28	2 44	1 24	1 41	4 40	5 0	10 8	10 27	5 50	6 10
M	4	1 41	1 58	6 5	6 24	3 1	3 18	1 58	2 15	5 19	5 38	10 47	11 7	6 30	6 50
Tu	5	2 14	2 32	6 43	7 2	3 35	3 54	2 33	2 51	5 57	6 16	11 27	11 48	7 10	7 29
W	6	2 49	3 8	7 21	7 40	4 13	4 32	3 9	3 28	6 34	6 52	—	0 9	7 47	8 5
Th	7	3 27	3 46	7 59	8 20	4 52	5 13	3 47	4 8	7 10	7 30	0 30	0 52	8 24	8 44
F	8	4 7	4 27	8 41	9 3	5 35	5 58	4 30	4 53	7 50	8 11	1 15	1 39	9 4	9 25
S	9	4 48	5 11	9 27	9 52	6 23	6 49	5 18	5 45	8 33	8 56	2 3	2 28	9 46	10 7
S	10	5 36	6 4	10 20	10 53	7 18	7 51	6 14	6 46	9 21	9 50	2 54	3 21	10 29	10 56
M	11	6 34	7 7	11 31	—	8 28	9 10	7 22	8 4	10 22	10 59	3 51	4 24	11 31	—
Tu	12	7 47	8 29	0 14	0 56	9 57	10 41	8 50	9 36	11 43	—	5 0	5 40	0 13	0 56
W	13	9 16	9 59	1 37	2 17	11 23	mid.	10 16	10 52	0 29	1 13	6 20	7 0	1 40	2 21
Th	14	10 38	11 15	2 54	3 27	—	0 30	11 24	11 52	1 53	2 28	7 36	8 8	2 59	3 35
F	15	11 45	—	3 56	4 22	0 57	1 22	—	0 16	2 59	3 27	8 34	8 59	4 7	4 36
S	16	0 11	0 34	4 44	5 5	1 44	2 5	0 38	1 0	3 52	4 16	9 23	9 45	5 3	5 26
S	17	0 56	1 18	5 26	5 46	2 25	2 43	1 21	1 40	4 38	4 59	10 5	10 26	5 49	6 10
M	18	1 38	1 56	6 5	6 24	3 0	3 17	1 58	2 16	5 18	5 36	10 46	11 6	6 30	6 49
Tu	19	2 14	2 31	6 42	7 0	3 34	3 52	2 33	2 50	5 54	6 12	11 26	11 46	7 7	7 25
W	20	2 48	3 4	7 18	7 36	4 10	4 28	3 7	3 24	6 30	6 45	—	0 5	7 42	7 59
Th	21	3 23	3 41	7 53	8 10	4 46	5 4	3 41	3 58	7 0	7 15	0 24	0 43	8 16	8 32
F	22	3 57	4 14	8 28	8 46	5 22	5 41	4 16	4 35	7 30	7 45	1 2	1 21	8 48	9 4
S	23	4 30	4 47	9 4	9 22	6 0	6 19	4 54	5 14	8 0	8 16	1 40	1 59	9 20	9 35
S	24	5 5	5 24	9 41	10 3	6 39	7 1	5 35	5 57	8 32	8 51	2 18	2 38	9 51	10 8
M	25	5 45	6 7	10 28	10 57	7 27	7 56	6 22	6 50	9 12	9 36	2 59	3 21	10 28	10 52
Tu	26	6 34	7 4	11 31	—	8 27	9 3	7 21	7 57	10 6	10 39	3 47	4 16	11 22	11 59
W	27	7 35	8 12	0 7	0 43	9 43	10 21	8 36	9 15	11 17	11 56	4 47	5 20	—	0 36
Th	28	8 52	9 35	1 18	1 53	10 57	11 31	9 52	10 24	—	0 37	5 54	6 29	1 14	1 50
F	29	10 10	10 43	2 25	2 56	—	0 2	10 54	11 22	1 16	1 51	7 3	7 34	2 24	2 57
S	30	11 13	11 40	3 25	3 50	0 29	0 52	11 46	—	2 22	2 50	8 2	8 26	3 28	3 56
S	31	—	0 4	4 13	4 33	1 13	1 33	0 7	0 27	3 16	3 41	8 48	9 10	4 23	4 48

Week Day.	Month Day.	Liverpool. A.M.	Liverpool. P.M.	Greenock. A.M.	Greenock. P.M.	Queenstown. A.M.	Queenstown. P.M.	Kingstown. A.M.	Kingstown. P.M.	Londonderry. A.M.	Londonderry. P.M.	Brest. A.M.	Brest. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
F	1	9 9	9 29	9 46	10 8	2 38	3 1	8 59	9 22	5 50	6 9	1 33	1 54
S	2	9 47	10 3	10 27	10 46	3 21	3 40	9 41	9 57	6 27	6 45	2 12	2 29
S	3	10 20	10 38	11 5	11 24	3 59	4 18	10 13	10 29	7 3	7 21	2 46	3 4
M	4	10 56	11 15	11 43	—	4 37	4 56	10 46	11 3	7 39	7 57	3 22	3 40
Tu	5	11 31	11 53	0 3	0 23	5 15	5 34	11 22	11 41	8 14	8 31	3 58	4 17
W	6	—	0 12	0 43	1 3	5 54	6 14	—	0 1	8 48	9 6	4 36	4 53
Th	7	0 32	0 52	1 23	1 43	6 34	6 55	0 21	0 42	9 25	9 45	5 15	5 35
F	8	1 13	1 34	2 3	2 24	7 17	7 40	1 4	1 27	10 6	10 30	5 57	6 21
S	9	1 57	2 21	2 47	3 11	8 8	8 27	1 52	2 19	10 59	11 33	6 46	7 13
S	10	2 47	3 16	3 36	4 4	8 54	9 22	2 47	3 17	—	0 13	7 42	8 14
M	11	3 48	4 28	4 35	5 11	9 57	10 38	3 52	4 33	0 57	1 46	8 50	9 33
Tu	12	5 15	6 3	5 53	6 36	11 22	—	5 16	5 58	2 35	3 17	10 20	11 6
W	13	6 49	7 28	7 19	7 58	0 5	0 45	6 37	7 13	3 54	4 25	11 46	—
Th	14	8 2	8 30	8 33	9 5	1 22	1 56	7 46	8 17	4 51	5 14	0 21	0 52
F	15	8 55	9 17	9 32	9 57	2 24	2 50	8 44	9 10	5 36	5 58	1 19	1 43
S	16	9 38	9 58	10 20	10 42	3 14	3 36	9 34	9 54	6 20	6 41	2 5	2 25
S	17	10 18	10 37	11 4	11 25	3 58	4 18	10 11	10 28	7 1	7 20	2 44	3 2
M	18	10 56	11 14	11 44	—	4 36	4 54	10 45	11 2	7 38	7 55	3 20	3 38
Tu	19	11 32	11 50	0 2	0 20	5 13	5 32	11 20	11 38	8 12	8 28	3 56	4 14
W	20	—	0 8	0 38	0 56	5 51	6 7	11 56	—	8 44	9 0	4 32	4 49
Th	21	0 26	0 43	1 14	1 32	6 24	6 42	0 14	0 32	9 16	9 32	5 6	5 23
F	22	1 0	1 17	1 50	2 7	7 0	7 18	0 51	1 10	9 49	10 7	5 41	5 59
S	23	1 35	1 53	2 24	2 42	7 35	7 52	1 29	1 48	10 26	10 49	6 17	6 36
S	24	2 12	2 31	3 0	3 20	8 10	8 31	2 8	2 30	11 16	11 46	6 57	7 19
M	25	2 52	3 16	3 41	4 5	8 53	9 17	2 54	3 20	—	0 20	7 43	8 11
Tu	26	3 46	4 21	4 32	5 3	9 47	10 24	3 51	4 27	0 58	1 40	8 43	9 20
W	27	5 1	5 41	5 38	6 15	11 0	11 40	5 3	5 38	2 21	2 57	9 58	10 38
Th	28	6 22	6 58	6 53	7 28	—	0 14	6 12	6 45	3 32	4 1	11 15	11 50
F	29	7 31	8 0	8 2	8 32	0 48	1 21	7 16	7 45	4 27	4 50	—	0 20
S	30	8 24	8 46	8 59	9 23	1 49	2 14	8 11	8 35	5 10	5 29	0 46	1 10
S	31	9 7	9 27	9 45	10 7	2 38	3 1	8 59	9 21	5 48	6 8	1 31	1 52

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ add. — *sub.*), to the time of high water on the given day at the port of reference, we have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 3	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 3	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 3	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Helgoland	+0 21	Dover
Holyhead	−1 12	Liverpool
Holy Island harbour	−0 53	N. Shields
Honfleur	+5 42	Brest
Inverness	−1 59	Leith

Place.	Constant. H. M.	Port of Reference.
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 18	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 58	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 23	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 43	London
Youghall	+0 13	Queenstown

THE DARIEN CANAL.

MR. JOSEPH NIMMO, JUN., the Chief of the United States Bureau of Statistics, has made a report to the Secretary of the Treasury on the proposed American Inter-Oceanic Canal and its possible effects on American Commerce, and the following is a summary of his conclusions:—

"1. That the Shipping which would annually pass through the American Inter-Oceanic Canal would amount to about 1,500 vessels, or 1,625,000 tons annually.

"2. That the possible amount of tonnage which might pass through the Suez Canal was about twice as great as that which might pass through the proposed American Canal, and that the possibilities of the Suez Canal with respect to value of Commerce were three times and a half as great as those of the proposed American canal.

"3. That the traffic of the proposed American canal would probably be confined, as is the traffic of the Suez Canal, almost exclusively to steam vessels.

"4. That during the latest year for which commercial statistics can be collected the proposed American canal might have afforded a passage for 7 3-10ths per cent. of the foreign Commerce of the United States, $2\frac{3}{4}$ per cent. of the foreign Commerce of Great Britain, $1\frac{1}{2}$ per cent. of the foreign Commerce of France, and less than 3 per cent. of the international Commerce of the globe upon the ocean.

"5. That there has been a very large diversion of traffic from the route between San Francisco and New York, *via* the Isthmus of Panama to the transcontinental railroad, the value of commodities transported between New York and San Francisco *via* Panama having fallen from 70,202,029 dols. in 1868 to 4,947,755 dols. in 1879, and the number of passengers having fallen from 26,853 in 1869 to 4,496 in 1879.

"6. That the trade between the Atlantic and the Pacific ports

of the United States, *via* Cape Horn, has also been to a considerable extent diverted to the transcontinental railway line.

"7. That there is now a large and growing Commerce between the Pacific ports of the United States and interior points east of the Rocky Mountains. The proposed canal would not present any direct competition to this trade between interior points in the United States and ports on the Pacific coast.

"8. That the Commerce between the Pacific ports of the United States and Europe would probably seek the passage through the proposed canal in steam vessels.

"9. That the magnitude of the Commerce of the countries on the western coast of South America is limited by that most marked orological feature of the Continent, the Andean range, extending from the Isthmus of Panama to the Straits of Magellan, and also by conditions of climate and soil hereinbefore described.

"10 and 11. That the shipment of guano and nitrate of soda from the western coast of Peru and Bolivia, giving employment to about 810,000 tons of shipping annually, the part of the trade of Chili with the Atlantic ports of the United States and with Europe, *via* Cape Horn, giving employment to about 385,000 tons of shipping annually, would probably continue to pursue that route.

"12. That 28 per cent. of the tea imported into the United States during the year ended June 30, 1879, was imported at Pacific ports and 72 per cent. at Atlantic ports of the United States, and that probably the entire tea supply of the Atlantic sea-board States will eventually be brought from the countries of its production to San Francisco, and thence overland by rail.

"13. That, on account of the nautical conditions involved in the passage through the proposed canal, sailing vessels engaged in trade between the Atlantic sea-board of the United States and Australia and New Zealand will probably continue to pursue either the passage around Cape Horn or the passage around the Cape of Good Hope.

"In obtaining these facts he furnishes some interesting *data*. The commercial utility of the canal with respect to the Atlantic and Gulf ports of the United States is practically limited to trade east of the 110th meridian of longitude east of Greenwich. This

is so, he thinks, because the consideration of distance would prevent vessels between Africa, Asia, and Australia, and vessels between the Atlantic and Gulf ports of the United States and Europe, Africa, and almost all of Asia, except China and Japan, from passing *via* canal. About 34 per cent. of the shipping in the China and Japan trade with the Atlantic ports of the United States now seeks the Suez Canal route, or 11,796 miles. By the American canal from New York to Hong Kong it would be 558 miles shorter, yet Mr. Nimmo does not believe that passage would be sought by the new route, unless it should be quite as favourable as Suez with respect to facilities for transit and coaling, which he doubts, as also whether the nautical conditions would be as favourable. The transportation of wheat becomes a very important item in this connection, and two questions are suggested—first, whether sailing vessels with wheat would be likely to take that route; second, whether steam vessels would not supersede sailing vessels in the wheat trade. At a low toll Mr. Nimmo's information is that steamers might take that route, yet he has also assurances that California wheat, being of a hard, flinty nature, it would not pay to take it through the canal at 1 dol. a ton. The South American trade has already been referred to. Comparing the commercial aspects of the Suez and American canals more closely, and recapitulating in part in order to show their relative importance, Mr. Nimmo points out precisely how far commercial possibilities have been realised in practice. There might have passed through Suez in 1878 tonnage amounting to 6,313,742. Only 3,291,535 tons did pass through. On the same basis of calculation there might pass through the American canal 2,938,386 tons, but it would more likely be 1,625,000. The cost of the Suez canal was 92,273,907 dols. The receipts last year on 3,236,942 tons were 5,973,186 dols., and the expenditures, including 5 per cent. interest upon the share capital as sinking fund, were 5,415,542 dols., leaving a balance of 557,645 dols. From this a calculation can be made upon the profits of an American canal.

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. W. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, *High Holborn, London, W.C.;* 6, *Lord Street, Liverpool; and* 10, *Erskine Street, Leicester.*

ENGLISH (APPLICATIONS).

3302. Henry Whiteside Cook, Stondon Massey, Essex. "Improvements in the construction of navigable vessels, and in the mode of and means for propelling the same, parts of which improvements are applicable to vessels of ordinary construction."

3333. Thomas Ely Norton, Southampton. "Improvements in anchors."

3339. Louis Constant Cheneval, Compiègne, France, and Louis Janssens, and Edmond Bodart, both Louvain, Belgium. "Improvements in the construction of ships for transporting grain." (A communication.)

3350. Michael F. Davis, Portland, Maine, U.S.A. "Improvements in the apparatus for propelling and steering row boats." (A communication.)

3378. Auguste Figge and Le Comte Stanislas Julien Ostrorog, both of Paris, France. "An improved apparatus for propelling vessels." (A communication.)

3383. Eleanor A. McMann, Cleveland, Ohio, U.S.A. "Improvements in safeguards for sleeping berths." (A communication.)

3402. James Taylor, Birkenhead. "Improvements in and relating to screw-propellers."

3408. Reginald Grahame, New Malden, and Charles E. A. Baloche, Southwark. "Improvements in steadying floats for use on board ships and other boats, and which can be used as life-saving apparatus in emergency."

3459. Paul Duval, Paris, France. "An improved system of submersive or unsinkable boats and ships." (A communication.)

3486. Walter J. Griffiths, Bayswater. "Improvements in the manner of placing and arranging the screw-propeller in screw ships, and in the form or construction of screw-propellers."

3489. John Kennedy, Liverpool. "Improvements in and relating to governors applicable for marine and other engines."

3503. Thomas Forster, Streatham. "Improvements in flexible boats for the preservation of life at sea."

3535. John Francis Fisher, Liverpool. "Improvements in and relating to apparatus for leaving on record the cause or notifying why a vessel is missing, and other particulars thereof."

3549. William Henry Wheeler, Oxford." "Measuring quickly and accurately, with one portable instrument by one operation and by a single observer, the distance of any terrestrial object by land or sea, particularly adapted to range-finding."

3565. Charles William Meiter, Gracechurch Street, London. "New or improved construction of certain signals for steam and other vessels."

3582. George Fellows Harrington, Ryde, Isle of Wight. "Improvements in propelling ships or vessels."

3614. Gustav Reuter, Hamburg, Germany. "Improvements in apparatus and in the arrangement of mechanism for driving boats." (A communication.)

3661. Thomas Porter Walker, Derby. "Improvements in and appertaining to the propulsion of ships or vessels, and in apparatus therefor."

3704. Charles Jones, Liverpool. "Improvements in screw-propellers for navigable vessels."

3713. Charles Haslett, Southampton Row, and John Gordon Thomson, Little Guildford Street, Bloomsbury, Middlesex. "Improvements in apparatus for raising sunken ships."

3725. William Webster, San Francisco, California, U.S.A. "Improvements in sewing-machines for stitching sacks, bags, ships' sails, carpets, and for other like purposes."

3734. Alexander Maxwell, Ritchie, Dundee, N.B. "A new or improved appliance or ball for signalling at sea or on land."

3738. George Josiah Archer, Westbourne Park, Middlesex. "Improvements in floats for fishing purposes."

AMERICAN.

230388. Will Adair, Caumer. "A folding shipping coop."

230537. Anthony M. Elliott, Kenosha. "A breakwater and pier."

230566. Kingsley R. Olmsted, Chicago. "A reaction propeller wheel."

230661. Paul Carl Rousset, St. Petersburg, Russia. "A deep-sea sounding apparatus."

230690. Eugene A. Bennett, Phelps, New York. "A rowing gear for racing boats."

230737. Harvey H. Burritt, Newark, New Jersey. "A compound engine for canal steamers."

230838. C. E. Tripler and William H. Roff, New York. "A rowing vehicle."

230849. Augustus H. Able, Philadelphia. "A water-gauge for marine boilers."

230998. Eben M. Boynton, West Newbury, Massachusetts. "A construction of ships, &c."

231016. Michael F. Davis, Portland, Maine. "An oar and scull."

231017. Michael F. Davis, Portland, Maine. "A footboard and steering apparatus for boats."

231041. William Hensey, Wamego, Kans. "An undershot water-wheel."

231072. William McKay, Detroit, Michigan. "A nipper for boat ropes."

221079. Albert L. Moore, and Norman S. Parker, Portland. "A turbine water-wheel."

231117. Thomas L. Sturtevant, South Framingham, Massachusetts. "A folding boat."

PATENTS PUBLISHED.

PROTECTING SHIPS' BOTTOMS, &c.

3690. September 15, 1879. Price 4d. George Straker Fair Edwards, South Shields, Durham. For a first coat a composition is employed consisting of finely pulverized resin dissolved in benzoline spirits. In a separate mixer pure oxide of zinc and

pure Indian red are mixed into a paste with pure oil and thin Stockholm tar and the dissolved resin is added thereto. The second coat consists of resin dissolved in specially fine benzoline spirit and added to a paste of pure oxide of zinc and best red oxide of iron with pure oil and Stockholm tar, to which 6 lbs. of arsenic is added for each hundredweight.

Lowering Boats.

3909. September 22, 1879. Price 2d. Francis Blakeman Hammond, Folkestone, Kent. (Not proceeded with.) An iron rod in two lengths is fixed lengthwise in the boat, one length above and the other below the thwarts. The ends of the rods are attached to a lever fixed perpendicularly and moving upon a rod in the middle of the boat. By means of the lever the rods are simultaneously withdrawn from their sockets at the end.

Propelling and Steering Steamships.

219. January 17, 1880. Price 2d. John Lorrimer Corbett and William Lockhead, both of Glasgow, N.B. The central body part of the propeller consists of a hollow close cylinder with a central eye to secure it to the lower end of its motive shaft, ranged vertically so as to revolve as a horizontal propeller wheel in the water below the hull of the ship, within segmented recesses formed in the hull. The blades are fitted to slide with their edges vertically and radially out and in through slots in the outer periphery of the central cylinder, with the broad face of the blades protruding out and acting vertically, and radially, and circumferently beyond the cylinder on the outer propelling side, and drawn quite within it on the inner or non-propelling side.

Indian Coast Navigation.—Commander Dundas Taylor, Superintendent of Indian Marine Surveys, is engaged in preparing a corrected edition of the West Coast of Hindostan Pilot, and a first edition of an East Coast of Hindostan and Bay of Bengal Pilot, the necessity for which have long been felt by navigators in the Indian seas, many ports having recently been opened up of which no mention whatever is made in any Sailing Directory extant.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
326	English Channel—Scilly Islands—St. Agnes	Character of light altered.
327	„ New Eddystone Lighthouse	Now partially obscures the light.
328	„ France—Cherbourg	Beacon on Raz de Bannes.
329	England—River Thames—Chapman	Change of light; amended notice.
330	„ East Coast—Would	New light-vessel established.
331	„ Bristol Channel—Flatholm and Avon	Change in lights; amended notice.
332	North Sea—Netherlands—Walcheren Canal	Alteration in Flushing and Veere lights.
333	„ „ Voorne Canal	Alteration in Hellevoetsluis and Nieuwesluis lights.
334	„ „ Hook of Holland Canal	Automatic signal-buoy replaced.
335	„ „ Ship Canal—Ymuiden Harbour	New automatic signal-buoy.
336	Baltic Entrance—Sound—Copenhagen	Beacon to mark torpedo-ground.
337	„ Great Belt—Sprogö	Discovery of shoal ground.
338	„ „ Lohals	New harbour light.
339	Baltic—Gulf of Bothnia—Storkallegrund	New light-vessel.
340	Norway—W. Coast—Væro and Kjeungen	New lights.
341	Mediterranean—Spain—Barcelona	Buoyage and lights of docks.
342	„ Corsica—Gulf of Porto Vecchio	New lights at Points St. Cipriano and Chiape.
343	„ Adriatic—Fiume	New lights.
344	„ Greece—Poros Harbour	Light re-established.
345	„ Grecian Archipelago—Samos Island—Tigani and Vathi	Particulars respecting lights.
346	„ Grecian Archipelago—Mityleni Island	Beacon on Mousselim rock.
347	„ Smyrna Harbour	Lights for mail steamers only.
348	Black Sea—Odessa	Extension of breakwater and new lights.
349	China—East Coast—Swatow—Cape Good Hope and Sugarloaf Island	New lights.
350	Russian Tartary—Peter the Great Bay—Port Vladivostock—Cape Goldobin	Particulars respecting lights and fog-signals.
351	Australia—Victoria—Port Albert—La Trobe Island	Light altered in colour.
352	New Zealand—North Island—Poverty Bay—Taraugauui River	New light.
353	South America—West Coast—Peru	Torpedoes in harbours.
354	„ Brazil—River Para	Reported light on Gaivotas island.
355	Central America—Yucatan—Celestun	Reported light.
356	United States—North Carolina—Albemarle Sound—Roanoke River	New fog-bell at lighthouse.
357	„ North Carolina—Pamplico Sound—Port Royal Shoal	Light on S.W. point discontinued.

MONTHLY ABSTRACT OF NAUTICAL NOTICES—*continued.*

No.	PLACE.	SUBJECT.
358	UNITED STATES—North Carolina—Pamplico Sound—Harbour Island	Light discontinued.
359	" New York—Hudson River—Rondout Creek	New lights on Government piers.
360	" Rhode Island—Block Island	Leading lights changed in colour.
361	" Massachusetts—Nantucket Harbour	Leading beacon-light discontinued.
362	" Massachusetts—Bass River—Vineyard Sound	Light discontinued.
363	" Maine—Brown's Head	Red sector now shown.
364	NEWFOUNDLAND—Trepassey Harbour—Powles Head	New automatic signal-buoy.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

326.—ENGLISH CHANNEL.—*Scilly Islands.—Alteration in Character of the St. Agnes Light.*—With reference to Notice 258, p. 698, the character of the St. Agnes light has now been altered from a flash every minute, to a *flash every half-minute.*

327.—ENGLISH CHANNEL.—*New Eddystone Lighthouse.*—About the month of November next, the erection of the *new* Eddystone lighthouse will be so far advanced as to obscure the Eddystone light over an arc of 10 degrees, viz., between the bearings of S. 14° E. and S. 24° E. from the lighthouse.

328.—ENGLISH CHANNEL.—*France.—Approaches to Cherbourg.—Beacon on Bannes Reef.*—A beacon tower has been erected on Raz de Bannes, situated about 5½ miles westward of Cherbourg. The tower has an elevation of 10 feet above high water springs, is painted red with a white top, and surmounted by a mast with an iron ball. This beacon forms a valuable landmark for vessels approaching Cherbourg from the westward in thick weather.

329.—ENGLAND.—*River Thames.—Sea Reach.—Alteration in Character of the Chapman Light.—Amended Notice.*—With reference to Notice 286, p. 777, that during January, 1881, this light will be made occulting, the following *amended notice* has been issued. The Chapman light will be under occultation *twice* in quick succession *every half-minute*, that is to say, it will suddenly

disappear for three seconds, and then, as suddenly, reappear at full power for three seconds; again suddenly disappear for three seconds, and then reappear at full power for the remainder of the half-minute. Further notice will be issued.

330.—ENGLAND.—*East Coast.—New Light-vessel in the Would.*—With reference to previous Notice, with a view of facilitating the navigation through the Would, a light-vessel, with a *quick-revolving light*, showing *a flash every five seconds*, has been placed off the South end of Haisbro' Sand, with the following bearings, viz.:— South Haisbro' buoy, E. by N. ¼ N., distant 1$\frac{5}{10}$ths mile; S.W. Haisbro' buoy, N.E., distant 1$\frac{2}{10}$ths mile; Newarp lightship, S. by E. ¼ E., distant 6 miles.

N.B.—The attention of mariners is particularly directed to the difference in character between the light shown from the Would and that of the Newarp and the Leman and Ower light-vessels. The Would will be as described above, viz., a quick-revolving light, showing a flash every five seconds; but the Newarp and the Leman and Ower are group-flashing lights, the Newarp showing *three* flashes in quick succession, followed by an interval of thirty-six seconds of darkness (the whole revolution occupying *one minute*), and the Leman and Ower giving *two* quick flashes, followed by twenty seconds of darkness, and repeated every *half-minute.*

331.—ENGLAND.—*Bristol Channel.—Alteration in Character of the Flatholm and Avon Lights.—Amended Notice.*—With reference to Notice 295, p. 780, that during January, 1881, these lights will be made occulting, the following amended notice has been issued. The Flatholm light will be under occultation *twice* in quick succession *every half-minute*, that is to say, it will suddenly disappear for three seconds, and then, as suddenly, reappear at full power for three seconds; again suddenly disappear for three seconds, and reappear at full power for the remainder of the half-minute; and the Avon light *once* in *every half-minute*, that is to say, it will once in every half-minute suddenly disappear for three seconds, and then, as suddenly, reappear at full power. Further [illegible]ce will be issued.

[illegible]2.—NORTH SEA.—*Netherlands.—Walcheren Canal.—Altera[illegible] in Vlissengen and Veere Harbour Lights.*—The following

alterations have been made in the harbour lights exhibited on the West mole heads at Vlissengen (Flushing), and at Veere. The fixed red lights are discontinued, and in place thereof *fixed green* lights are now exhibited.

Note.—Whenever the harbour is inaccessible, the green light is not exhibited, but a *fixed red* light is shown farther out, at the extremity of the West mole. The green and red lights shown at the same time, on the West mole, indicate that the harbour is not accessible for vessels drawing over 19½ feet.

333.—North Sea.—*Netherlands.*—*Voorne Canal.*—*Alterations in Hellevoetsluis and Nieuwesluis Harbour Lights.*—The following alterations have been made in the colour of the harbour lights exhibited on the moles. At both places, the harbour mouth of Voorne canal is now indicated by two *fixed green* lights.

334.—North Sea.—*Netherlands.*—*Hook of Holland Canal.*—*Automatic Signal Buoy off Entrance.*—An Automatic flute (Courtenay's) buoy has been again placed off the entrance to the Hook of Holland canal; it is painted white, and moored in 9 fathoms water, with the following bearings and distances, viz.:—Scheveningen lighthouse, E. by N. ⅜ N., distant 12 miles; Waterweg North mole head, S.E. by E. ½ E.; Goeree lighthouse, S.S.W., distant 10⅔rds miles. Position, lat. 51° 59′ 50″ N., long. 4° 0′ 25″ E. *Variation*, 16° *W.*

Note.—The white buoy with black flag (which previously served as a fairway buoy), and the white buoy temporarily placed there, have been withdrawn.

335.—North Sea.—*Netherlands.*—*Ship Canal.*—*Automatic Signal Buoy off Ymuiden Harbour Entrance.*—An Automatic flute (Courtenay's) buoy has been placed experimentally, as a fairway buoy, nearly two miles distant from the mole heads of Ymuiden (Noordzehaven) harbour; it is painted red, and moored in 8⅓rd fathoms at low water spring tides, with the following marks and bearings, viz.:—Egmond north lighthouse, N.E. ¼ E.; Ymuiden lighthouses in line, S.E. by E. ¼ E.; Bathing house at Zandvoort, S. ¾ W. Position, lat. 52° 28′ 30″ N., long. 4° 30′ 15″ E. *Variation*, 16½° *W.*

336.—Baltic Entrance.—*The Sound.*—*Torpedo Ground near*

Copenhagen.—A beacon is exhibited to indicate the locality where torpedo experiments are made, between Provestenen and Mellem forts, near Copenhagen.

337.—Baltic Entrance.—*Great Belt.*—*Shoal Ground Westward of Sprogö.*—A sunken danger (on which there is a depth of 17 feet) about 100 feet in diameter and composed of large rocks, has been recently found about 1⅓ cable W.N.W. from the former position of the floating beacon marking the extremity of the western reef off Sprogö. The floating beacon has in consequence been moved to the westward of this new shoal, or about 2 cables in a W.N.W. direction.

338.—Baltic Entrance.—*Great Belt.*—*Langeland Island.*—*Harbour Light at Lohals.*—It is a *fixed white* light, elevated 25 feet above the sea.

339.—Baltic.—*Gulf of Bothnia.*—*Light-vessel on the Storkallegrund.*—It shows a *fixed white* light visible 11 miles; and a steam-whistle during fog gives a blast of 45 seconds' duration every 3 minutes. Particulars next month.

340.—Norway.—*West Coast.*—A *fixed white* light has been established at Væro; and a light *fixed white* and *red* at Kjeungen, on the Kjeungskjær, which rock is covered at high water. Particulars next month.

341.—Mediterranean.—*Spain.*—*Port Barcelona.*—*Buoyage and Lights of Docks.*—The undermentioned buoys—from which lights are exhibited at night—mark works in progress at the entrances to the docks of port Barcelona. 1. Two conical beacon buoys, painted black and white, and surmounted by a globe—from each of which a *white* light is shown during the night—mark the entrance of the Commercial dock. One buoy is placed at the eastern extremity of Barcelona mole; the other buoy at the western extremity of Capitania mole. 2. A beacon buoy, painted red—from which a *red* light is shown during the night—marks the entrance to the building dock. The buoy is placed at the eastern extremity of Capitania mole—the entrance lying tween it and the western extremity of the New or Carbon le.

Note.—Barcelona mole, of which the first course of stones has

been laid on the foundation, is 328 yards in length. Capitania mole, on the foundation of which, laying the first course of stones has been commenced, is about 219 yards in length. Vessels not drawing more than 23 feet can enter between the black and white beacon buoys, also between the red beacon buoy and the Western extremity of Carbon mole.

342.—MEDITERRANEAN.—*Corsica.—East Coast.—Gulf of Porto Vecchio.*—(1) *Light on St. Cipriano Point.*—Exhibited from a lighthouse recently erected on St. Cipriano (Giovan-Lungo) point, north side of entrance to gulf of Porto Vecchio; it is a *fixed* light, visible between the bearings of S. 53½° W. (through north) and S. 82½° E., showing *white*, except through two sectors, which will be *red;* elevated 80 feet above high water; the white light visible from a distance of 10 miles, and the red light 6 miles. The first sector of *red* light will be shown through an arc of 18½° over the Pecorella rock—between the bearings of N. 52° W. and N. 70½° W. The second sector of *red* light will be shown through an arc of 12°, between the bearings of N. 85½° E. and S. 82½° E. In order to clear Benedetto bank, vessels should not enter this sector. The lighthouse, 37 feet high, is square in shape and constructed of masonry; keeper's dwelling attached. Position, lat. 41° 37′ 5″ N., long. 9° 21′ 20″ E.

(2) *Chiape Point Light.—Sector of Red Light.*—A sector of *red* light is now shown from Chiape (Chiappa) point lighthouse, south side of entrance to gulf of Porto Vecchio; this sector of *red* light will be visible through an arc of 14°, between the bearings of S. 16° W. and S. 30° W. Chiape point light is visible from a distance of 23 miles; the red light 17 miles.

Note.—This red sector and the first mentioned red sector of St. Cipriano light indicate the position of Pecorella rock. Mariners will be clear of this danger as long as one of the two lights at the entrance to the gulf appears white. *Variation*, 13° *W.*

343. — MEDITERRANEAN. — *Adriatic. — Gulf of Quarnero. — Alteration in Lights and Buoyage at Fiume.*—With reference to previous notices respecting the harbour lights at Fiume. (1) The fixed light (*red* and *white*) exhibited from the lighthouse on north side of entrance, southward of the Academy, is visible over an

arc of 240°, or from the bearing of N.W. by W. through north and east to S. ½ W. (2) Also, the light-vessel at the entrance to port Fiume has been moved 90 yards nearer to the head of the mole, and now lies in 23 fathoms water, with the lighthouse south of the Academy bearing N.N.E., distant 2½ cables; during the day, the light-vessel carries a ball striped in red and white bands. (3) The fixed light exhibited from Adamich mole shows *white* between the bearings of N.N.E. and E.N.E.; *red* from E.N.E. through east and south to West; *white* from West to W.S.W., and *red* from W.S.W. through west and north to N.N.E. The sectors of white light illuminate the mole and its prolongation. A conical buoy with staff and cross, encircled by a ring, has been placed about 22 yards from the extremity of Fiumara mole.

344.—MEDITERRANEAN.—*Greece.—Poros Island.—Re-Establishment of Harbour Light.*—With reference to previous notice the light at the northern entrance to Poros harbour was re-exhibited in the middle of July.

345.—MEDITERRANEAN.—*Grecian Archipelago.—Samos Island.*—(1) *Position of Lighthouse at Port Tigani.*—The lighthouse on east side of entrance to port Tigani, is situated on Glykora point. The light (*fixed white*), elevated 54 feet above the sea, is visible from a distance of 10 miles. Position as given, lat. 37° 41′ 25″ N., long. 26° 58′ 40″ E.

(2) *Position of Lighthouse at Port Vathi.*—The lighthouse on east side of entrance to port Vathi, is situated on Kotzikas point. The light (*fixed white*), elevated about 260 feet above the sea, is visible from a distance of 16 miles. Position as given, lat. 37° 47′ 15″ N., long 26° 58′ 35″ E.

(3) *Harbour Light at Port Vathi.*—A fixed light is exhibited from the extremity of the mole in course of construction on the east side of port Vathi, near Katchouny point. This light, which shows *red* to seaward and *white* towards the harbour, is exhibited from an iron lamp-post 19 feet above the sea, and visible from a distance of 4 miles. In December, 1879, the mole was completed to a length of 295 feet. Position as given, lat. 37° 45′ 35″ N., long. 26° 59′ 40″ E.

346.—MEDITERRANEAN.—*Mityleni Island.—Beacon on Mousselim*

Rock. — A beacon has been placed on Mousselim rock, in Mousselim channel, north of Mityleni island.

347.—MEDITERRANEAN.—*Gulf of Smyrna.—Harbour Lights at Smyrna Harbour.*—The harbour lights (*fixed red*) at the entrance to Smyrna harbour, are only exhibited when the arrival of the mail steamer is expected. When the steamer is about to enter the harbour basin, the colour of the eastern light is changed from *red* to *green*, occasionally showing that colour all night.

348.—BLACK SEA.—*Odessa.—Extension of Breakwater and Exhibition of Lights.*—It is intended to extend the breakwater in Odessa bay for a distance of 349 yards in a westerly direction; and in order to mark this proposed western extremity, two fixed white lights are exhibited from posts.

Note.—Vessels should not pass between these lights and the present west extreme of the breakwater.

349.—CHINA.—*East Coast.—Port of Swatow.*—(1) *Light on Cape Good Hope.*—Exhibited from a lighthouse erected on the Cape Good Hope, south side of approach to the port of Swatow, Han river. The light shows *fixed red* from the bearing of S. 32° E. to S. 10° E.; *white* (with an eclipse of about four seconds' duration every minute) from S. 10° E. through south and west to N. 8½° E.; and *red* (with an eclipse of about four seconds' duration every minute) from N. 8½° E. until shut in by Ma-urh point. Elevated 171 feet above the level of the sea; the white light should be visible 15 miles, and the red light 8 miles. The light tower, 22 feet high, is constructed of iron. The tower, dwellings and boundary wall are painted white. Position as given, lat. 23° 14′ N., long. 116° 47′ E. (approximate).

(2) *Light on Sugarloaf Island.*—Exhibited from a lighthouse erected on Sugarloaf island, south side of entrance to the port of Swatow. It is a *fixed white* light varied by a *red* flash every half minute, elevated 200 feet above the sea, and visible from a distance of 8 miles. The light tower, 22 feet high, is constructed of iron and painted red. The keeper's dwellings are painted white. Position as given, lat. 23° 19′ 10″ N., long. 116° 44′ 25″ E. (approximate).

350.—RUSSIAN TARTARY.—*Peter the Great Bay.—Port*

Vladivostock.—Lights and Fog-Signal on Cape Goldobin.—With reference to previous notice respecting the establishment of two lights and a fog-signal at cape Goldobin, the lights are exhibited from posts painted red; the upper light, elevated 45 feet above the ground and 53 feet above sea, should be visible 8 miles; the lower light, elevated 44 feet above the ground and 48 feet above sea, should be visible 7½ miles. A watch-house with yellow walls and red roof stands near the position of these lights.

Note.—The line of these two lights in one, passes through the low point of cape Tokarefski. The *fog-bell*, placed in a building with a red roof, near the position of the lights, is sounded at regular intervals during thick or foggy weather, but more rapidly in answer to signals from seaward.

351.—AUSTRALIA.—*South Coast (Victoria).—Port Albert.—La Trobe Island Light.—Alteration in Colour.*—The colour of the light (fixed and flashing) exhibited from near the east point of La Trobe island, approach to port Albert, is now *red*, instead of *white* as previously.

352.—NEW ZEALAND.—*North Island.—East Coast.—Poverty Bay.—Light at Turanga-Nui River Entrance.*—Exhibited from the flagstaff on the west side of Turanga-nui river entrance, Poverty bay; it is a *fixed red* light, elevated about 38 feet above high water, and visible from a distance of about 5 miles. Position, lat. 38° 40′ 30″ S., long. 178° 2′ 30″ E.

Note.—The harbour master reports that the best anchorage for steam vessels is with this light bearing N.N.E. in 6 fathoms water—westward of that the ground is foul. *Variation, 14½° E.*

353.—SOUTH AMERICA.—*West Coast.—Peru.—Torpedoes in Callao Road and Ancon Bay.*—As numerous torpedoes are or may be floating in Callao road, Ancon bay, and other roadsteads during the war between Chili and Peru, mariners when in the vicinity of these anchorages should use great caution.

354.—SOUTH AMERICA.—*Brazil.—Light on Gaivotas Island, Braganza Channel.—River Para.*—A *fixed white* light is reported to have been placed on this island; elevation 35 feet above the water; visible 9 miles. Position given, lat. 0° 35′ 20″ S., long. 48° 1′ W.

355.—Central America.—*Yucatan.—West Coast.—Fixed Light at Celestun.*—A light is reported to be established at Celestun, west coast of Yucatan. It is a *fixed white* light, and has been seen from a distance of 10 miles. Position as given, lat. 20° 51′ N., long. 90° 25′ W.

356.—United States.—*North Carolina.—Albemarle Sound.—Fog-Signal at Roanoke River Lighthouse.*—On the east side of the lighthouse at the entrance to Roanoke river. The signal is a bell, which during thick or foggy weather will be struck at intervals of *fifteen seconds.*

357.—United States.—*North Carolina.—South-west Point. Royal Shoal Light.—Discontinued.*—This fixed white light, shown from a screw-pile lighthouse on the south-west point of Royal shoal, Pamplico sound, has been discontinued.

358.—United States.—*North Carolina.—Harbour Island Light.—Discontinued.*—This fixed white light shown from a screw-pile lighthouse between Pamplico and Core sounds, has been discontinued.

359.—United States.—*New York.—New Stake-Lights at Mouth of Rondout Creek, Hudson River, New York.*—The following stake-lights are now displayed from the Government piers or dikes at the mouth of Rondout creek:—On end of North dike, a *fixed red* light, 21 feet above mean low water; on middle or bend of North dike, a *fixed red* light, 21 feet above mean low water; on end of South dike, a *fixed white* light, 19 feet above mean low water. The lights are displayed from Mississippi river lanterns, suspended from masts.

360.—United States.—*Rhode Island.—Change of Colour of Block Island Breakwater Leading Lights.*—These lights which guide into the anchorage near the breakwater are now *fixed red*, instead of fixed white, as heretofore shown.

361.—United States.—*Massachusetts.—Nantucket Range Beacon-Light.—Discontinued.*—This fixed white light formerly situated about a mile south-east of the light on Brant point, west side of entrance to Nantucket harbour, has been discontinued.

362.—United States.—*Massachusetts.—Bass River Light.*—

Discontinued.—The fixed white light on north side of Vineyard sound has been discontinued.

363.—United States.—*Maine.—Change of Characteristic of Brown's Head Light.*—On and after September 15, 1880, the light displayed from Brown's Head lighthouse, western entrance to Fox Island Thoroughfare, will show *red* between the bearings N.E. by E. ¾ E., and E. by N. ¼ N., nearly. This red sector (of 12° 35′) defines the channel between Fiddler's Ledge on the north and the Bay Ledges on the south.

Note.—Vessels entering or leaving the western entrance of the Thoroughfare will clear both of these dangers by keeping in the red light.

364.—Newfoundland.—*South-East Coast.—Trepassey Harbour.—Automatic Signal Buoy off Powles Head.*—A Courtenay's Automatic whistling buoy has been moored off Powles head, eastern entrance point of Trepassey harbour, with the following bearings and distances, viz.:—Powles head, N.E., distant 1¼ mile; Freshwater point, S.E. ¼ E.; Cape Pine, W. ⅛ S. *Variation, 29½° W.*

Charts, &c., Published by the Hydrographic Department, Admiralty, in July, and August, 1880.

No.		*s.*	*d.*
588	South America, west coast:—Tom bay anchorages	1	6
88	Spain, north coast:—San Sebastian	1	0
1061	Plan added, Port Eyre.		
1806	Africa, west coast:—Great Fish bay to Walfisch bay (plan, Great Fish bay)	2	6
2648	Plan added, Bay and port of Les Sables d'Olonne.		
263	Plan added, St. Francis harbour.		
269	Plan added, St. Augustine harbour.		
1382	Tahiti and Moorea (Otaheité and Eimeo) (plans, Papetoai and Cook bays.) Harbours and anchorages on the north coast of Tahiti	2	6
[illegible]0	England, south coast:—Portland to Owers ...	2	6
[illegible]06	Plan added, approaches to Bud.		

No.		s.	d.
865	South America, west coast:—Anchorages in Wide channel and Indian reach—Grau; Elena; Sandy, coves, Port Micaela. Chacabuco bay	1	0
2898	South Indian ocean:—Kerguelen island	2	6
1508	South-west Pacific:—Anchorages in the New Hebrides; plans, ports Resolution, Stanley; Lisburn, Dip Point, Rodds, Sangalie, Sakau anchorages; Lakova, South-West, Steep Cliff bays; Maskeleyne, Shepherd islands and Bice Road	1	6
649	Australia, E.C. Queensland:—Mary river	2	0
2158	Mediterranean; eastern and western sheets, each...	5	0
1875	North sea:—Elbe, Weser, and Jade rivers ...	2	6
56	India, west coast:—Ratnagiri, Mirya and Kalbadavie bays	1	6
459	West Indies, Jamaica:—Montego and Carlisle bays, port Maria, Dry, Green island, St. Lucea and Manchioneal harbours, Mosquito cove, Blewfields anchorage	1	6
448	West Indies, Jamaica:—Pedro bluff to South Negril point	2	6
859	India, bay of Bengal:—Mutlah river to Elephant point	2	6
880	West Pacific:—Solomon islands; Marau sound ...	1	6
989	Gulf of Siam:—Lacon roads to Lem Tane ...	2	0
1935	Falkland islands:—Bay of Harbours and Bull road	1	0
2890	North America, east coast, Nantucket shoals to Block island (plan added, Vineyard haven) ...	2	6

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No.	
1687	Mediterranean, Sicily:—Messina harbour.
1526	Mediterranean, Greece:—Mandri channel.
1061	Australia, south coast:—Cape Catastrophe to the Great Australian bight.
1678	Mediterranean, Adriatic:—Plans of ports.

No.	
2348	North America, west coast:—Sitka or New Arkhangel.
2609	France, south coast:—Rade d'Agay to St. Remo.
2606	France, south coast:—Les Saintes Maries to Marseille.
1187	Mediterranean:—Alicante to Palamos, and the Balearic islands.
2762	South Indian ocean:—Comoro islands, with the adjacent coasts of Africa and Madagascar.
1759	China:—Pih-ki-shan to Hie-shan islands.
2219	England, south coast:—Needles and North channels.
120	North sea:—River Schelde, from the sea to Antwerp.
2521	New Zealand:—Tauranga harbour.
263	Labrador:—Cape St. Charles to Sandwich bay.
1730	South Pacific ocean:—Samoan or Navigator islands.
269	United States, east coast:—Sapelo sound to Florida and Providence channels.
2664	France, west coast:—Pte. d'Arcachon to pte. de la Coubre.
2306	Norway, sheet 4:—Romdals islands to Hitteren island.
2764	Australia:—Coral sea and Great Barrier reefs.
802	South Indian ocean:—Prince Edward, Crozet head, and McDonald islands.
2220	Black sea ports.
255	Jamaica:—Morant point to port Royal.
2645	West coast of France:—Ile de Groix to Raz de Sein.
99	French Guiana:—Salut islands anchorage.
2431	North America, west coast:—Port Simpson to Cross sound.
47	India, west coast:—Bate harbour.
2221	Black sea:—Port Saijak.
1354	Falkland islands.

Books.

	s.	d.
MEDITERRANEAN PILOT, vol. III. Comprising the Adriatic sea, Ionian islands, the coasts of Albania and Greece to cape Malea, with Cerigo island. Including the gulfs of Patras and Corinth, 1880 ...	3	6

	s.	d.
ADMIRALTY CATALOGUE of charts, plans, and sailing directions, 1880	1	0
NORWAY PILOT, part II. From the Naze to North cape, thence to Jacob river, 1880	3	0

HYDROGRAPHIC NOTICES RECENTLY PUBLISHED BY THE HYDROGRAPHIC OFFICE, ADMIRALTY, 1880.

No. 15.—PACIFIC. Information relating to Nanuku passage and the north-east portion of the eastern group of the Fiji islands.

No. 16.—CHINA SEA DIRECTORY, vol. I., Relating to Junkseylon island and the adjacent coast of Siam.

No. 17.—CHINA SEA DIRECTORY, Vol. IV., Relates to Maucka cove, and the adjacent west coast of Saghalin island.

No. 18.—MEDITERRANEAN PILOT, Vol. II., Information relating to the coasts of Karamania and Iskanderún.

No. 19.—SOUTH INDIAN OCEAN. Information resulting from the recent visit to the Crozet islands of H.M.S. *Comus*.

No. 20.—CHANNEL PILOT, part II. Beacon on Bannes reef, westward of Cherbourg.

No. 21.—UNITED STATES, east coast. Information relating to currents on the coast of North Carolina.

No. 22.—AFRICA PILOT, part III. Information relating to Mecusa river.

No. 23.—SOUTH AMERICA PILOT, part II. Information relating to Magellan strait, Skyring and Otway waters, Concepcion bay, St. Ambrose, and St. Felix islands.

No. 24.—CHINA SEA DIRECTORY, vol. III. Information relating to Amoy harbour.

No. 25.—WEST INDIA PILOT, vol. II. Relates to Aves islet and Mona island.

No. 26.—WEST INDIA PILOT, vol. I. Relating to the bar of Rio Magdalena.

No. 27.—NEW ZEALAND PILOT. Information relating to D'Haussez group and bay of Plenty.

OUR OFFICIAL LOG.

Official Inquiries at Home, 1880.

692. *Cato*, s.s., *Duke of Cambridge*, s.s.; the former a small steam ferry-boat; owned by the London and Tilbury Railway Company; tonnage, 80; and the latter a passenger boat belonging to the London Steam Boat Company; tonnage, 49; on a trip to Gravesend with passengers. In collision off Gravesend, July 5, 1880. Inquiry held at Westminster, August 3, 1880, before Rothery, Wreck Commissioner; Beasley and Comyn, N.A. Both masters to blame. Certificates not dealt with.

696. *Morning Star*, ship; built at St. John's, New Brunswick, 1854; owned by the Merchants' Trading Company (Limited); tonnage, 1,288; Liverpool to Quebec; salt, copper dross, &c.; abandoned at sea, May 7, 1880. Inquiry held at Liverpool, August 5, 1880, before Mansfield, Judge; French and Harland, N.A. Abandonment justifiable. Vessel's bowport being stove in from collision with ice.

698. *Caroline*, s.s.; built at Liverpool, 1878; owned by the Carron Company; tonnage, 382; Grangemouth to London; general cargo; stranded on Fiddra, July 18, 1880. Inquiry held at Leith, August 6, 1880, before Wilkie and McIntosh, J.P.; Cowie and Murdoch, N.A. Master in default for not using the lead. Certificate suspended for three months.

704. *Rokeby*, s.s.; built at West Hartlepool, 1874; owned by Mr. T. E. Pyman and others; tonnage, 733; Cronstadt to Wiborg; ballast; stranded on Verkie Martala Rock, Gulf of Finland, June 11, 1880. Inquiry held at Middlesborough, August 4, 1880, before Coleman, Judge; Vaux and Anderson, N.A. Stranding due to an error of judgment. Master's certificate not dealt with.

705. *Hydaspes*, ship, and *Centurion*, s.s.; the former owned by Mr. J. Park and others; tonnage, 2,092; London to Melbourne; general cargo and passengers; the latter built at Jarrow-on-Tyne, 1876; owned by Mr. W. McMurray; tonnage, 1,178; Almeria to London; esparto grass, &c.; in collision off Dungeness, July 17,

1880, when the *Hydaspes* foundered. Inquiry held at Westminster, August, 13, 1880, before Rothery, Wreck Commissioner; Parfitt and Clarke, N.A. Master of *Hydaspes* and pilot of the *Centurion* to blame for accident, inasmuch as the former should have shortened in his hawser and kept the tug in sight, and the latter should not have altered his helm until he had ascertained the course of the approaching vessel. Certificates not dealt with.

706. *Crighton*, s.s.; built at Sunderland, 1872; owned by the Steam Navigation Company (Nord), Limited; tonnage, 807; the Tyne to Stockholm; coals; stranded and lost on Demban Shoal, in the Baltic, June 29, 1880. Inquiry held at Westminster, August 18, 1880, before Rothery, Wreck Commissioner; Comyn and Forster, N.A. Casualty due to the master steering improper courses; but under the circumstances he was merely warned to be more careful in future.

708. *Quail*, s.s.; built at Jarrow-on-Tyne, 1870; owned by the Cork Steamship Company; tonnage, 581; Antwerp to Glasgow; general cargo; stranded near Port Patrick and subsequently beached on Ailsa Craig. Inquiry held at Glasgow, August 17, 1880, before Smith and Hamilton, J.P.; Cowie and Murdoch, N.A. Master in default in not using the lead, and for proceeding at full speed during foggy weather. Certificate suspended for three months, and recommended for one as mate during that period.

710. *Merton*, schooner; built at Swansea, 1825; owned by Messrs. G. H. and H. Gann; tonnage, 104; West Hartlepool to Ramsgate; coals; supposed to have foundered at sea. Inquiry held at Westminster, August 17, 1880, before Rothery, Wreck Commissioner; Grant and Curling, N.A. No evidence before the Court to show cause of disaster.

714. *Edith Hough*, s.s.; built at Seacombe, 1869; owned by Mr. S. Hough; tonnage, 565; Riga to United Kingdom; timber; stranded on Mellgrunel shoal, Gottland, July 6, 1880. Inquiry held at Liverpool, August 24, 1880, before Mansfield, Judge; Wilson and French, N.A. Casualty due to the default of both master and mate, and the former was severely censured, and the master's certificate of the latter suspended for six months.

715. *Meredith*, s.s.; owned by Mr. R. Thorman and others;

tonnage, 634. Inquiry held at Middlesborough, August 21, 1880, into the circumstances attending the escape of steam and boiling water from the valve box lid of the starboard boiler through which loss of life ensued, before Coleman, Stip. Mag.; May, E.A., and Ward, N.A. Casualty caused by the cover of the safety-valve box not being properly secured, five instead of twelve bolts only being in their places. Chief engineer mainly responsible for the accident.

716. *Secret*, barque; built at Sunderland, 1847; owned by Mr. A. Watt and others; tonnage, 342; Hartlepool to Dantzic; coals; supposed to have foundered at sea. Inquiry held at Middlesborough, August 19, 1880, before Coleman, Stip. Mag.; Powell and Anderson, N.A. No evidence to show from what cause the vessel was lost.

717. *Albert Edward*, s.s.; and *Alexandra*, s.s.; the former built at Woolston, 1878; owned by London and South-Western and London and Brighton Railway Companies, jointly; tonnage, 163; employed carrying passengers; the latter built at Greenock, 1879, belonging to the same Companies, and also employed carrying passengers; tonnage, 234; in collision off Ryde Pier, August 5, 1880. Inquiry held at Portsmouth, September 1, 1880, before Rothery, Wreck Commissioner; White, Castle, and Beasley, N.A. Accident caused by master of *Alexandra* starboarding his helm and not stopping sooner. Court held however that his certificate should not be dealt with.

Official Inquiries Abroad.

694. *Offley*, barque; lost in Recherche Bay, April 26, 1880. Inquiry held at Hobart Town, May 20, 1880. Master in default in neglecting to let go a second anchor. Certificate suspended for six months.

695. *Manawattu* (p.s.); suffered damage by collapsing of the crown of the furnace, April 22, 1880. Inquiry held at Wellington, N.Z. Accident due to carelessness on the part of the engineer in charge. Certificate suspended for three months.

697. *Gondolier*, ship; wrecked on Sable Island, May 3, 1880. Inquiry held at Halifax, U.S., June 24, 1880. Master much to

blame for neglecting to use the lead. Certificate suspended for six months.

699. *Euro*, s.s.; stranded on Ward Spit, Spencer Gulf, May 29, 1880. Inquiry held at Adelaide, June 17, 1880. Casualty due to an error of judgment on the part of the master.

700. *Water Lily*, barque; lost May 16, 1880. Inquiry held at Sourabaya, June 21, 1880. Accident due to the current. Master exonerated.

701. *Crest of the Wave*, ketch; lost in Smith's Bay, Kangaroo Island, April 30, 1880. Inquiry held by Marine Board of South Australia. No blame attached to master.

702. *Cadzow Forest*, barque; stranded on a reef, near Port Mathurin, April 6, 1880. Inquiry held by the Mauritius Marine Board. Master to blame. Certificate suspended for nine months.

703. *Armenia*, barque; stranded on Green Island, April 10, 1880. Inquiry held at Amherst, May 21, 1880. Master in default. Certificate suspended for six months.

707. *Vingorla*, s.s.; foundered at sea, February 29, 1880. Inquiry held at Bombay, March 19, 1880. No evidence to show from what cause the vessel foundered.

709. *Tasman*, ketch; lost in Smith's Bay, Kangaroo Island, June 24, 1880. Inquiry held by Marine Board of South Australia. Master exonerated from blame.

711. *Pilgrim*, schooner; lost at sea. Inquiry held at Port of Spain, July 9, 1880. Loss occasioned through vessel being in a leaky state. Master not mentioned.

712. *Sisters*, schooner; lost at entrance of Richmond River. Inquiry held at Sydney, June 14, 1880. Master free from blame.

713. *Australian Sovereign*, barque; lost on Simonee Reef, New Caledonia, June 6, 1880. Inquiry held at Sydney, June 23, 1880. Master in default. Certificate suspended for three months.

718. *Meath*, s.s.; stranded on East Lamock Island, May 16, 1880. Inquiry held at Hong Kong, June 2, 1880. Accident due to an error of judgment on the master's part.

719. *F. W. Harris*, s.s.; lost at Chance Cove Head, Newfoundland, July 1, 1880. Inquiry held at St. John's, July 19, 1880.

Master to blame in not using the lead. Certificate suspended for four months.

720. *Wanganui*, s.s.; lost at entrance of Clarence River, June 20, 1880. Inquiry held at Sydney, July 1, 1880. Master in default for attempting the harbour at an improper time of the tide. Certificate suspended for three months.

721. *Emmeline*, ketch; lost at Camden Haven. Inquiry held at Sydney, July 5, 1880. Accident caused by failure of wind at a critical time. No blame attached to master.

Apprentices to the Sea Service.—Merchant Seamen, Payment of Wages, &c., Act, 1880.—As some misapprehension appears to have arisen with reference to the changes made by the Merchant Seamen's Act, 1880, in the law regulating the position of apprentices to the sea service who may neglect or refuse their duty to their employers, the Board of Trade think it well to give a short explanation in the matter. 1. In the first place it is an error to suppose that the jurisdiction in such disputes is remitted to the county courts. A reference to the Employers and Workmen's Act of 1875 (which by the present Act is made to apply to seamen and apprentices to the sea service) will show that it remains, as before, with any court of summary jurisdiction, that is with the magistrates. 2. It is true that the imprisonment of apprentices for "desertion" or "neglecting to join" is now forbidden, but, under the 6th section of the Employers and Workmen's Act, where an order is made directing an apprentice to perform his duties under the apprenticeship the Court may, if satisfied that the apprentice has failed to comply therewith, order him to be imprisoned for a period not exceeding 14 days. It must further be noted that sub-sections 4 and 5 of section 243 of Merchant Shipping Act, 1854, remain unaffected, and by these two sub-sections apprentices are still liable to imprisonment for "wilful disobedience to any lawful command" or for "continued wilful neglect of duty." 3. Although an apprentice, by giving 48 hours' notice under section 10 of the Merchant Seamen's Act, 1880, can protect himself from liability to be summarily sent on board by order of a magistrate, it may be contended that the very fact of

his giving such notice constitutes *primâ facie* a violation of the indenture of apprenticeship, and exposes him to be at once taken before a magistrate in order that his case may be dealt with according to circumstances, either under section 243 of the Merchant Shipping Act, 1854, or under the provisions of the Employers and Workmen's Act, 1875.—EVELYN ASHLEY.—THOMAS GRAY, Assistant-Secretary, Marine Department, Board of Trade, 3rd September, 1880.

GENERAL.

LIGHT DUES.

WE are glad to announce that a further relief has been extended to the shipowner in respect of light dues, as shown in the following extract from an Order in Council, dated 6th September :—

"1. That on and after the 1st day of October, 1880, vessels trading or going as aforesaid, between the United Kingdom, the islands aforesaid, and the Continent of Europe between the River Elbe and Brest inclusive, shall, as respects such lights as would be chargeable on coasting vessels passing them, be liable to light duties at the same rates (subject to the same abatements) as coasting vessels, and to no other.

"2. That on and after the 1st day of October, 1880, the abatement or discount to be allowed upon the amount of tolls specified in the said New Consolidated Tables of Light Dues mentioned in the said Orders in Council of the 24th day of October, 1870, and the 16th day of May, 1871, and upon the amount of tolls specified in the said other Orders in Council hereinbefore referred to, and in this Order in Council, shall, in the case of every oversea vessel and of every coasting vessel, be 60 per cent. and no more.

"C. L. PEEL."

The effect of the first provision will be to lessen considerably the amount hitherto payable by vessels voyaging between the ports of this country and those between the Elbe and Brest, by transfering them from oversea to coasting rates. The benefit to such vessels will it is estimated be equivalent to a reduction of about two-thirds from the amount hitherto paid.

The effect of the second provision is to increase the abatement from *all* light dues payable by 5 per cent., which is equal to a *reduction* of 5 per cent. The principle of an abatement from the gross amount chargeable for each light is the means employed to ensure an elasticity adapted to reductions or additions according to the financial condition of the Mercantile Marine Fund.

The above reductions have been made in consequence of the favourable condition of the Mercantile Marine Fund at the present time.

FLORIDA.—The British Consul at Mobile, in his report this year, calls attention to the great resources of Florida, and says that its industries can be made more varied than those of any other State in the Union. Not to speak of its sea-island and ordinary cotton, its corn, sugar, potatoes, and other vegetables, the orange business of Florida is immense, and is rapidly increasing. Millions upon millions of oranges are sent by railroad to all parts of the United States. The orange crop of Florida in 1879 was valued at over 1,000,000 dollars, and the crop of this year was thought likely to reach 100,000,000 of oranges, for which the dealers would give the growers 1,500,000 dollars. Florida is said to stand in official sanitary reports as the healthiest State in the Union. The Consul says the climate is not hot in summer, and not so oppressive as the midsummer north. This results from the peculiar peninsular shape of the State, and the ever-recurring sea breezes which pass over it. The Gulf breeze comes with the setting sun, and cools the air at night. A sultry night is rare. The thermometer seldom goes so low as 30° in winter, and rarely reaches 90° in summer. The average in summer is 82°. South of Pilatka there is no fear of frost. During the entire year the rainy, cloudy, disagreeable days are the exception. The supply of delicious fruits is unlimited for months. Aliens may purchase, hold, and sell lands without becoming citizens of the United States. The supply of timber is described as inex-istible. The Consul states the population of Florida at about ,000, and the area at about 38,000,000 acres.

THE

NAUTICAL MAGAZINE

FORTY-NINTH YEAR.

VOLUME XLIX.—No. XI.

NOVEMBER, 1880.

SUBMARINE TELEGRAPH CABLES.

A PROJECT for the International Protection of Telegraphic Cables under the high seas was for the first time, as, we believe, submitted to the consideration of the European Powers by the Government of the United States in 1869, and a desire was then expressed by that Government that a Conference of Representatives of the various Powers should be held at Washington to discuss the provisions of an International Convention for that object. Various circumstances, however, concurred to prevent any such Conference being held, but at the Telegraphic Conference held at Rome, in 1871, the subject was brought forward by the delegate from Norway. His proposal, however, was held to exceed the competence of the Conference, which had been assembled to discuss purely administrative questions, and it was accordingly withdrawn. The subject, however, was again brought to the notice of the Conference by Mr. Cyrus Field, who has promoted most of the great telegraphic enterprises in the United States, and who communicated to it a letter from Professor Morse,* praying the Conference

* Professor Morse's telegraph was announced in 1837, but did not come into practical use before 1844. It is now said to be more used than any other. Three attempts to maintain telegraphic communication across the

to express by its vote a desire "that in war as in peace the telegraph in the air and under the water should be regarded as a sacred thing, protected by unanimous consent against all attack or damage." The Conference was thereupon induced to declare that the questions suggested to it by Mr. Cyrus Field were worthy of the attention of the Governments, and the Italian Minister of Foreign Affairs was requested to bring this declaration to the notice of the various Powers. He complied with the request of the Conference, but made no substantive proposal to the Governments out of deference to the Cabinet of Washington, which had already invited the Powers to a diplomatic conference on the subject. The Austro-Hungarian Government alone responded to the Italian Minister's communication by a note, in which it discussed the proposals of Mr. Cyrus Field.

The main feature of the project of the Government of the United States, which may account for France and Great Britain not lending a ready ear to the suggestion of a diplomatic conference on the subject, was the provision that the intentional destruction or malicious damage of a submarine telegraphic cable should be assimilated to an act of piracy, and that every person convicted of such an act should be regarded as a pirate and punished accordingly, and that the contracting parties should enact laws to ensure the prosecution of the offender and the punishment, if he should be found guilty of the offence.

It would appear from the Austro-Hungarian note already alluded to, that the Austro-Hungarian Government was not indisposed to assent to an International Convention amongst the Maritime Powers, which should assimilate *in a certain manner* to piracy every intentional act tending to destroy or to damage a telegraphic sea-cable beyond the limits of territorial waters, and which should establish certain uniform rules for the repression and punishment of persons so offending; but this expression of the willingness of the Austro-Hungarian Government to acquiesce in

---

Atlantic have failed from the cable snapping in 1857 and in 1865, and from its becoming useless in 1858. A fourth attempt in 1866 has proved perfectly successful.

the proposal submitted to it, requires to be construed with due regard to the observations which precede it in the same note, which are to the effect that submarine telegraphic cables beyond the territorial limit of a maritime league are in waters which do not belong to any particular State, and over which territorial laws as such have no operation, and that the malicious destruction or damage of telegraphic cables beneath the high seas present in certain respects an analogy to acts of piracy, which, although committed beyond the limits of every nation's territorial jurisdiction, are notwithstanding punishable in an uniform manner by the particular laws of every State. This we apprehend to be a view of the subject, which falls somewhat short of the American proposal, that all parties intentionally destroying or damaging a cable-telegraph beyond the limits of territorial waters should be regarded as pirates and punished accordingly, and which is embodied in the 83rd article of Mr. David Dudley Field's project of an International Code (second edition), namely, "Any person whosoever, who without authority from the owner and with intent to injure, vex, or annoy any other person whomsoever, or any nation whatever, removes, destroys, disturbs, obstructs, or injures any oceanic telegraphic cable not his own, or any part thereof, or any appurtenance or apparatus therewith connected, or severs any wire thereof, is deemed a pirate."

We fully agree with our brethren of the United States in regarding the malicious destruction of an oceanic cable-telegraph as a very grave offence,* and in holding that every nation has an interest in securing from unforeseen interruption the present mode of instantaneous communication between the American and European continents, so much so as to justify a common concert on their part to prevent any such interruption from the malice of individuals. But it is one thing for nations to agree in a declaration that the malicious destruction of a cable-telegraph beneath the high seas is an act hostile to their common welfare, and calcu-

* It is said that in the United States, expeditions by sea have been more than once planned for the destruction of an oceanic cable-telegraph, but that the projects were abandoned from want of sufficient funds to ensure success.

lated to prejudice in the highest degree their common interests, and as such deserving of punishment at the hands of every nation: it is another thing to declare the offender in such a case to be an enemy of the human race (*hostis humani generis*), and to place him in the same category with a pirate, whose hand is against every one whom he meets with on the high seas, and therefore every man's hand is justly raised against him in self-defence. Death is also the penalty of piracy by the Law of Nations, and the tribunals of every country have a recognised right to inflict that penalty upon a pirate, who sails under no recognised flag, and is self-excommunicated from the family of nations.

There is no difficulty, we apprehend, in particular nations entering into treaties with one another to protect what are termed "cables d'atterrissage," in other words those portions of oceanic cables which are within their respective territorial waters, and several nations have inserted special provisions with that object in their respective penal codes.* The difficulty arises as soon as the cable passes into the region of the high seas, where the police of the sea can only be exercised according to the custom of the high seas or in accordance with an international concert. Piracy is the one offence respecting which there is a tacit concert amongst all nations that the offender shall forfeit his life, where the *animus furandi* is established against him. There are many minor offences, however, which are held to partake of a piratical character, and for which some minor penalty short of death is now-a-days inflicted in accordance with the milder manners of the age. Accessories, for instance, as distinguished from the parties principal, are, under the common law of nations, punished by imprisonment for piratical acts, at the same time that the parties principal are sentenced to death for the crime of piracy. On the other hand, the slave trade—perhaps the next great crime against

* The English Statute 24 and 25 Vict., ch. 97, combines within its scope malicious injuries to telegraphs, and declares such offences, if done within the jurisdiction of the Admiralty of England or Ireland, to be offences of the same nature and liable to the same punishments as if they had been committed upon the land in England or Ireland.

the human race after piracy—is only an international offence in virtue of international treaties, which authorises its suppression by the cruisers of the Signatory Powers, but under no International Treaty has death been the penalty of the trade in slaves on the high seas, notwithstanding the abolition of the slave trade as a principle of public law was adopted at the Congress of Vienna in 1815, and the resolution of that Congress was affirmed at the Congress of Aix la Chapelle in 1818, and was re-affirmed at the Congress of Vienna in 1822. Further, although nations have agreed with one another, that their flag shall not protect a vessel engaged in the slave trade from being seized by a cruiser under another flag than their own, they have been careful to provide that each case of seizure shall be adjudicated before a mixed tribunal, of which their own commissioner should be a member. They have thus steadfastly refused to consent that the slave trader should be treated as a pirate, and should be handed over as such to the tribunals of the seizor. With this long experience of the reluctance of nations to renounce altogether, even under such nefarious circumstances, the independence of their flag on the high seas, we think it most improbable that they would be induced to agree that persons sailing under the protection of their flag should be liable to seizure by the ships of other nations for the offence of destroying a cable telegraph, unless the parties accused of the misdeed should be sent for trial before a tribunal of their own country.

The preliminary question, which deserves consideration, is whether the maintenance of the telegraphic sea-cables, which have an international importance, is an interest of the highest order to States, analogous to the interest of the public health and of the public revenue, which each nation is allowed by courtesy to protect beyond the strict limits of its territorial waters. If we look to the public services which the telegraphic sea-cable is now called upon to perform in time of peace, that it has become the normal instrument of communication between Governments and their envoys in foreign countries; that international treaties are from time to time concluded between the nations of the two hemispheres through the medium of cable telegraphs; that

through the same instrumentality approaching tempests are announced in advance to Europe from America, by which great damage and destruction to life and shipping may be averted; that no great criminal can now hope to escape from Europe to the western shores of the Atlantic Ocean with the fruits of his crime without a telegram anticipating his arrival, when he finds himself the captive of the law at the moment when he expects to set his foot upon a land of liberty; the answer to the question above stated must, we think, be in the affirmative, and there can be no doubt that the great arterial lines of telegraphs have become indispensable for the circulation of the political life blood so necessary to maintain the vitality of our modern international State system. So much being conceded, it will not be surprising that the protection of telegraphic sea-cables, which have an international importance, was brought under the consideration of the *Institut du Droit International* during its Conference at Brussels in 1879. Professor Louis Renault, of the *École des Sciences Politiques* at Paris, was the reporter of a commission of members of the Institute, which had been appointed to consider the subject, and the discussion of Professor Renault's most able report and the resolutions of the Institute have been made public in the *Annuaire de l'Institut* for 1879-1880. The Institute was of opinion, in accordance with Professor Renault's Report, that the proposal of the Government of the United States to declare the intentional destruction of a telegraphic sea-cable to be an act of piracy and punishable accordingly went beyond the necessity of the case, and would subject the offender to penalties of too severe a character and out of proportion to the gravity of the offence. They held, however, that such intentional destruction might properly be declared to be an offence against the law of nations, which should be punished by every nation in an uniform manner. The Commission proposed that the right of seizing the offenders in each case should be exercisable by the vessels of all nations, but the right of judging the offenders should be reserved to the national tribunals of the captured vessel. After some discussion it was thought safer to limit the right of seizing the offenders to the public ships of all nations. For this modification of the report of the Com-

ission there were adequate reasons. In the first place the right of seizure would be exercised with more discretion by the commanders of public ships, whilst the chances of resistance and consequent loss of life would be diminished. Further, if the captured vessel were to be sent into port for adjudication before a tribunal of its own nationality, a prize-crew would virtually have to be put on board of her with the necessary witnesses to prove the offence, and a private merchant vessel could not be reasonably required to perform such duties. The following resolution was accordingly adopted by the Institute :—

"It would be very useful that the different States should come to an understanding to declare the destruction or the deterioration of telegraphic cables under the high seas to be an offence against the Law of Nations, and to determine in a precise manner the character of the offence and the penalties applicable to it, and on the latter point such a degree of uniformity should be attained as is compatible with the diversities in the criminal legislation of the respective States.

"The right of seizing the offenders or the persons presumed to be such may be given to the public vessels of all nations, but the right of judging the offender ought to be reserved to the national tribunals of the captured vessels."—[Translation.]

The proposal to limit the right of adjudicating upon the offence to the national tribunals of the captured vessel did not obtain the unanimous assent of the members of the Institute, and further, when the result of this decision of the Institute was communicated to the Conference of the Association for the Reform and Codification of the Law of Nations recently held at Berne, in Switzerland, several American members of the Association objected strongly to the Institute's decision. It is not too much to say that the members of the International Code Committee of the United States, of which Mr. David Dudley Field is deservedly president, might be reasonably expected to support the view advocated by their president, as already mentioned, and propounded by the Government of the United States for the consideration of the European Powers, and such was the case at Berne. We are ourselves responsible for proposing to the Institute at Brussels to depart so

far from the Report of the Commission as to limit the right of seizure to the public vessels of all nations for the reasons already mentioned, to which others might be added, but the proposal to limit the right of adjudicating upon the seizure to the national tribunals of the captured vessel was the proposal of the Commission, and we consider this to be almost an essential condition to make the proposal of an International Convention on the subject acceptable to those States, of which the political institutions are of a representative character. The chief arguments which were advanced in favour of the tribunals of the captor adjudicating upon the capture, were first, the heavy burden which would be enforced upon the captor, if he should be required to carry the captured vessel into a port of the country of its flag; secondly, the difficulties which would beset the captor in proceeding to adjudication in the courts of a foreign country; and thirdly, the risk of partiality on the part of the national tribunals of the captured vessel. We are disposed to think that a risk of partiality on the other side might with equal reason be suggested, if the captured vessel were carried for adjudication into a port of the captor's, so that the argument on the ground of probable partiality may be said to cut both ways. The other objections as advanced are of a more weighty character, but we think they would be met by the tribunal awarding costs and expenses to the captors, when the parties on board the captured vessel should be found guilty of the offence imputed to them. The majority however of the Institute was mainly influenced by the consideration that the European Powers would never consent that their subjects in such cases should be sent for trial before foreign judges, more particularly as the defence might involve a counter charge that the independence of their flag had been wrongfully violated by the captors.

The above remarks are chiefly applicable to cable-telegraphs under the high seas, more particularly where the destruction or deterioration of them has been malicious. But there may be cases of negligence, which Governments ought to anticipate and endeavour to prevent, instead of being satisfied with punishing the offenders less severely than in cases of malicious injury. We are not aware that hitherto any special provisions have been made in the penal

code of any nation for cases of negligence resulting in damage to cable-telegraphs, as distinguished from cases of negligence resulting in damage done to telegraphic wires on land, which, if they should be invisible beneath the earth, are probably out of all reach of damage by negligence. We allude to such cable-telegraphs as are laid in anchorage waters or in waters frequented by fishermen, and to the measures which Governments might require to be adopted in order to give notice of the course of the cables. It is not every cable-telegraph that can be sufficiently protected by a caution like that which appears in the English "Channel Pilot," respecting the submarine cables which extend from the South Foreland to Belgium and France respectively.* Where such a warning has been furnished, and is not heeded, damage done to a cable-telegraph through careless negligence, may justly be made the subject of a fine or a money compensation, as the case may require. But what shall we say of a case of this kind. A vessel outward bound from London to Calcutta with a valuable cargo was caught in a fog with a strong tide against her in the English Channel, somewhere between Dover and Calais, and under such circumstances that the pilot thought it prudent to let go his anchor, and wait for the turn of the tide. On the tide turning, orders were

---

* In *The Channel Pilot* the following notice is inserted for vessels navigating the Straits of Dover:—

"CAUTION.—A submarine cable extends from the South Foreland to Belgium. It takes an east direction from the Foreland, until without the stream of the Goodwin Sand passing half-a-mile to the northward of the South Sand Head light-vessel, after which it runs E.S.E. across the Flemish banks. Vessels are cautioned not to anchor within this mark or bearing on, lest they damage the electric cable or lose their anchors. A submarine cable also extends between the South Foreland and France, and, in order to prevent mischief occurring to it, vessels should not anchor within the distance of three or four miles of the English shore with the South Foreland high lighthouse bearing between N. and N.W., nor beyond that distance when it bears N.W. ¾ N. on which bearing it will appear in one with a dark patch on the cliff. Neither should vessels anchor on the French coast with the two conspicuous windmills of Coquelles which stand on high ground between Calais and Sangatte, bearing between S. by E. and S.E. by S.

given to weigh the anchor, and when the quantity of chain cable hove in announced that the anchor was off the ground, the vessel, to the surprise of the pilot, remained stationary. In this particular case, which we cite from our own knowledge, the commander of the vessel was a first-class seaman and navigator, and he at once divined the probable cause. He had a boat instantly lowered, and discovered that the anchor had hooked a cable telegraph. Without loss of time he ordered the anchor to be hove close up, hung the telegraphic cable, dipped the anchor clear, and the cable telegraph was allowed to return to its invisible bed at the bottom of the sea. It is not every commander of a merchant ship who would have had the presence of mind to deal promptly and effectively with such an unforeseen difficulty, and in the case in question, as the vessel was in pilotage waters, and in charge of a duly-licensed pilot, the owners of the vessel would have been relieved from all responsibility to make compensation to the owners of the cable-telegraph, if the cable-telegraph under the circumstances had been destroyed or deteriorated, provided always that the commander of the ship had not interfered, and all the pilot's orders had been obeyed. The anecdote is worthy of attention, as illustrating the necessity of dealing with questions of damage done to cable-telegraphs with a larger view of surrounding circumstances than may be sufficient in dealing with questions of damage done to telegraphic wires on land, and cases may arise where it may be necessary to decide whether it is the primary duty of the pilot to secure the safety of his ship at the expense of the cable-telegraph, or to preserve the integrity of the cable in the public interest at the risk of the ship, which is confided to his charge.

TRAVERS TWISS.

THE QUESTION OF THE LOAD-LINE.

DURING the recent visit of the President of the Board of Trade, the Right Hon. Joseph Chamberlain, M.P., to ports on the North-East Coast, he went to the shipyard of Messrs. E. Withy and Co., at West Hartlepool, and Mr. Withy took the oppportunity of addressing him at some length, on the much-vexed question of the load-line.

Mr. Chamberlain, in reply, said: "I am extremely obliged to you, Mr. Withy, and to the other gentlemen who have kindly accompanied me to-day, for the valuable information which I have received on this my first visit to the Hartlepools. Your remarks show how exceedingly complicated is the question of the load-line, and yet how important it is, in the interests of all, that the question should be speedily settled. I am aware of the many difficulties that surround it. The existing law does not permit the Board of Trade to fix an absolute load-line. There are instances in which applications have been made to us to fix one, but the Board of Trade have always declined to accede to such applications, for reasons into which I am afraid I have not time to enter just now. No doubt a feeling has been gaining ground of late, especially amongst many gentlemen connected with the shipbuilding and shipowning interest, that the present position of the question is extremely anomalous; and the department whose duty it is to look after the security of life and property has been again and again invited to state what in their judgment is a proper load-line. This, doubtless, from a sincere desire to do what is right. Of course, it seems extremely hard to refuse information under such circumstances, and especially so when ships are stopped at the behest of the very department by whom information is so refused, and who, at the same time, may be supposed to have formed some idea on the subject. This, I say, is an anomaly, and it is an anomaly that cannot last. During the late Session of Parliament a Committee was appointed to consider this particular question, and next Session that Committee, in all probability, will be reappointed. I hope, during the recess, to so post myself up that I may be pre-

pared with suggestions of my own to lay before that Committee when the proper time comes. And, present in that concrete form, I hope that the question will be fully considered with due regard to all the various interests concerned, such as those of the shipowners, shipbuilders, and underwriters, and that their views may receive proper attention. Without committing myself to any final conclusions, I may just say that there are certain considerations which have occurred to my own mind in the course of my inquiries on this subject. It would appear that the public department with which I am connected cannot properly take upon itself the responsibility of fixing a load-line. If it does fix a load-line it must fix a load-line that will be compatible with perfect safety. But that would not necessarily be a commercial load-line, and I can quite conceive that such a load-line, whilst designed in the interests of personal safety, might seriously interfere with the interests of the shipping trade at large. On the other hand, we could hardly expect a tribunal to whom such questions might be referred in the first instance to give complete satisfaction. Because a load-line might be fixed for one place—such as Hull, for instance—which would not answer for Hartlepool, and in that way trade might be crippled. There are, I conceive, no general principles upon which a question of this nature can be settled and adjusted for the country at large. Yet, I think it possible to establish a tribunal which would command the respect and confidence both of the general public and the shipowners as a class. It would be a tribunal for occasional resort, having judicial authority to settle all these questions as they arise. In a case like that the shipbuilder should be required to fix his own load-line. He ought not to be unwilling to do so, if he wished to consult his own interests. His duty would be to send up his ideas of what the load-line should be when building a vessel, and if the Board of Trade approved it there would be an end of it. On the contrary, if found to be unsatisfactory—if, in other words, the Board of Trade were of opinion that the freeboard was not sufficient, and if the shipbuilder or shipowner declined to accept the views of the Board of Trade, the question in dispute between them should be referred to the judicial authority which I have mentioned. And if

on this authority there is a large admixture of representation, of which the shipowning community, Lloyd's, and the Board of Trade itself possess an adequate share, there should be no ground of complaint. We might then arrive at certain principles of justice and fair play which would tend in course of time to allay irritation, remove doubt, and appreciably to reduce the number of cases needing adjustment. By this means the shipowning interest would be duly considered, and at the same time due guarantees taken for the security of life and property, in agreement with public opinion, which demands protection for ships and the crews that sail in them. I do not, however, wish it to be supposed that this is the line of action definitely resolved on; because after making up my own mind I would feel it to be my duty to lay the matter before the committee that is to sit, when it will receive careful consideration. This I may observe, is not in any sense a party question, where one interest may be pitted against another interest. I therefore think it quite possible enough to come to a general conclusion that shall be universally acceptable. I will not enter further into the matter, except to say that I approach it without the smallest feeling of prejudice, and trust that the parties most concerned will address themselves to it in a proper and becoming spirit, for it is only in that way that we can form a common basis of action."

This speech, which we reprint from the *Northern Echo* of the 9th ultimo, gives an intimation of what is likely to happen, and we are glad to record that in Mr. Chamberlain is found at last a Board of Trade President, who has the courage to deal with the load-line question. Down to this time the Board of Trade have always maintained that it is not possible to deal with it without 'rawing hard-and-fast lines of action and perpetrating injustice on ı shipping interest, and assuming responsibilities which that rd ought not to assume. The House of Commons has, by 'ng statute, taken a contrary view to the extent that the 's officers shall detain a ship which is overladen; and we observed from time to time that the Wreck Enquiry Courts have referred to freeboard tables issued by the Board of Trade. What those tables are we have no means of stating, nor do we

know how they are acted on. But the fact that they are so often referred to without contradiction shows that they exist, and as they exist the Board itself must have, and their officers must act on, some rules accepted by themselves. Mr. Chamberlain has, however, struck out a new line, and one which will relieve his department from responsibility, for even he seems to avoid that now, and probably wisely. He or his successor must incur it some day directly, even as his officers now undertake it indirectly. The difference is only in name, the practical result to the ship-owner one and the same. His ship is detained and the Board's officer detains her until lightened to a freeboard he fixes. The whole question resolves itself into one, which is, shall the Board's officer fix the load-line before the ship is loaded, or shall he wait and decide whether he shall interfere or not afterwards. It appears now that Mr. Chamberlain is about to appoint a Committee of Experts, and that he is intending to lay his own views before his Committee and then to appoint a "Tribunal" which shall be an "authority," and which shall contain "a large admixture of representation." Our readers will remember that we long ago advised the Chamber of Shipping to take a similar step, so that squabbles and delays by Board officers might be avoided by preliminary action on the part of shipowners and insurers.

We gather from the report of Mr. Chamberlain's speech that load-lines will be settled at last, and that the Board's officers will hereafter detain ships which they "find" overloaded, and refer the cases to the "Tribunal" for decisions. Now the question is, who are to be the members of this new "Tribunal," and is there to be only one Tribunal, or is there to be one at each of the ports guided by a Central Tribunal which shall be under the Wreck Commissioner or the Board of Trade? If the Tribunal is composed of independent men of knowledge and ability, the load-line difficulty will be solved, and although if solved in this way it will be quite counter to the views of Mr Plimsoll, it will be one other step in the right direction for which that gentleman, as in other cases, will probably receive all the credit. It matters not however who receives the credit so long as the present state of things is altered. The Board of Trade, while protesting against fixing a load-line, are in the

dilemma that they must now fix it under circumstances in which it is impossible to do it with justice or without delay and cost to every one, and it will be a relief to all if Mr. Chamberlain is able to cut the knot in the way his ingenuity and candour have foreshadowed, for the load-line will be fixed and that without annoyance, and with full consideration of, and allowance for, the different classes, constructions, and trades of ships.

THE S.S. YACHT "ANTHRACITE."

VOYAGE ACROSS THE ATLANTIC.

THE s.s. yacht *Anthracite*, official number 81,630, of 70 tons gross and 27 tons net register, built by Messrs. Schlessinger, Davis and Co., and engined by Messrs. Hawks, Crawshay and Sons, of Newcastle (Perkins' patent engines and boiler), is of the following dimensions:—

VESSEL.

Length	86	feet	4	inches.
Breadth	16	,,	1	,,
Depth	10	,,	2	,,
Draft loaded	9	,,	0	,,
Length of engine and boiler space...	22	,,	6	,,

Speed ... 8 knots at medium power.
,, ... $10\frac{1}{2}$,, maximum light.
Gross tonnage, 70·26.
Registered ditto, 27·91.

ENGINES.

Diameter of cylinder $7\frac{3}{4}$ inches high, single acting.
,, ,, $15\frac{13}{16}$ inches medium, single acting.
,, ,, $22\frac{13}{16}$ inches low, double acting.
Stroke, 15 inches.
Diameter of piston rods, $2\frac{3}{4}$ inches.
,, crank shaft, $5\frac{1}{2}$ inches.

Diameter of wrought-iron columns, 3 inches.
 ,, air pump, $11\frac{1}{2}$ inches.
 ,, circulating pump, $11\frac{1}{2}$ inches.
 ,, feed pumps, 2 inches, two in number.
 ,, bilge pumps, 3 inches, two in number.
Stroke of all the pumps, $4\frac{1}{2}$ inches.
Condensing surface, 422 square feet.

The total weight of the machinery—engines, boilers, screw-shaft, propellor, and all fittings—is 25 tons, and the maximum indicated horse-power is 170, at 154 revolutions per minute; nominal horse-power, 20; bunker capacity, 16 tons; fore and aft schooner rig, with stump masts.

After several trials in the Thames, it was decided to send her across the Atlantic and back, in order to test the capabilities of the Perkins' engine and boiler in a sea-way as regards rough work and economy of fuel.

On the 29th of May, started from Erith for Falmouth with a crew of twelve, viz., Captain E. G. Dent, mate, six seamen, two engineers, and two firemen. Arrived in Falmouth on the 31st. On the 2nd of June, at 6 p.m., steamed away for New York, with twenty-two tons of coal, six tons being in bags on deck. Passed the Lizard at 8 p.m., and signalised vessel's number. After leaving Scilly, encountered N.W. winds and heavy sea to lat. 43° 30′ N. and long. 30° W., when, finding that the coals would not last to New York against the now prevailing S.W. wind and sea, bore away for St. John's, Newfoundland. On approaching the Flemish Cap, found the discoloured water to extend farther east (by a degree) than is laid down on the chart. From the Flemish Cap to the western side of the Grand Bank and across the north end of the same, encountered continuous S.W. gales, heavy sea, thick fogs, and rain, with thunder and lightning at times; bar. 29·42, ther. 39°. This was on the 15th, 16th, and 17th of June.

On the 19th, wind shifted to N.W. with heavy rolling sea. On the morning of the 20th, moderate breeze, bright, fine, and clear. At noon, lat. 47° 49′ N., long. 52° 2′ W., bar. 30·10, ther. 43°, wind at N.W., passed more than twenty icebergs of various sizes. Arrived in St. John's, Newfoundland, at 6 p.m.

Crossing the Banks, the vessel was reaching under a balanced reefed mainsail and a reefed stay-foresail, engines going dead slow. The distance steamed from Falmouth to St. John's was 2,340 nautical miles, the number of revolutions made being 2,400,791.

On arrival, the balance of coal remaining was 1½ ton; this, with coals used for cooking in the galley, gives a consumption slightly over a ton per day, at an average of 350 lbs. pressure of steam per square inch, revolutions 120, and an average speed of 146 miles per day.

The above result, considering the deck-load and the undulations of the Atlantic, with the heavy weather encountered on the passage, is highly favourable as regards engines and boiler.

During the stay in Newfoundland the vessel was visited by most of the notables of the place, all of whom expressed their surprise, and their admiration of the vessel.

The coals obtained there were out of a screw steam barque that had been sealing, and, being saturated with seal oil, the smoke from them was highly objectionable.

Before leaving, a barque, of about 700 tons, with screw engines, arrived from the Grand Banks, being the first of the kind used for line-fishing. She had been out three weeks and came in nearly full of cod-fish, trimmed and salted; the crew was large; thirty-two small boats were used for line-fishing away from the steamer. The line-fishing was also carried on by the remaining portion of the crew left on board the steamer when at anchor on the Banks. It is doubtful as to this style of cod-fishing being a profitable one.

June 24th, at 5 p.m., left for New York; bar. 29·72, ther. 52°; strong winds from E.N.E., thick fog, heavy rains, cross and confused sea. Took the channel midway between the Grand Bank and Cape Race. On the following morning it cleared for a couple of hours, when we had a fine view of several large icebergs, evidently grounded on the shoal bank to the eastward of Cape Race. The fog then set in again, lasting until past Sable Island, St. George's Shoal, and to the east end of Long Island, being so dense as to be positively sickening; engines going half-speed.

The only vessel spoken on the passage from England was the Anchor Line steamer *California*, from London to New York, with whom we exchanged a few words. We were then about 250 miles from Sandy Hook.

Took a New York pilot on board, at 6 p.m., July 2nd. Passed Sandy Hook at 8 p.m., and anchored at Clifton, Staten Island, at 11 p.m.; eight days from St. John's; distance steamed, 1,154 miles; revolutions made, 1,208,183, most of the time going half-speed.

Remained in New York and its vicinity till August 16th, during which time the vessel steamed to the following places:—North and East Rivers, Hell Gate, Long Island Sound, Fisher's Island, Stonington, Watch Hill, Block Island, Point Judith, Narragansett, Beaver Head, Dutch Island, Beaver Tail, Newport and Providence, Rhode Island.

Twelve trial trips were made, with visitors on each occasion, viz., representatives of the press, engineers, scientific men connected with engineering, naval engineers, naval cadets, capitalists interested in steam power, and others too numerous to mention. The flow of visitors was continuous during our stay at Staten Island, at No. 50 pier in the East River, and at the usual yacht anchorage off Bellevue Hospital.

July 30th, steamed to Navy Yard, Brooklyn, for trial by the United States Naval authorities; vessel moored to the wharf, and, at 6 p.m. of August 10th, engines were started and kept going on the 11th, 12th, and 13th, and up to 10 a.m. of the 14th, three engineers at a time being on watch throughout the interval of trial. This finished the Naval trial, the accurate results of which will take weeks to tabulate and arrange, when they will be published. The general result was satisfactory.

August 16th, at 6.30 p.m., started for Philadelphia, and arrived at 10.30 a.m. of the 18th. After three trial trips with visitors interested in steam propulsion, went on the patent slip at Cramp's yard to cleanse and paint under the water-line.

At 6 p.m. of the 21st August, started for London, with twenty-five tons of coal on board, viz., sixteen tons in bunkers and nine tons in bags on deck; the latter less four bags thrown over-

board in a squall on the 25th, in lat. 40° N., long. 63° W. (the vessel heaving a list to port at the time), sufficed to steam 1,358 miles.

Passed the Bishop lighthouse at 6 p.m. of the 13th of September; and anchored at Falmouth at 7 a.m. of the 14th. Time of passage, 22 days 14 hours from the Delaware lightship. Distance covered, 3,316 miles; steamed, 3,126 miles; and sailed, 190 miles. The weather, though very coarse at times, was generally moderate on the passage, with occasionally a heavy cross sea.

Between Scilly and Falmouth it was severe in the extreme; hard gale from the S.W. with squalls, rain, and heavy sea. Full steam and all the canvas she could bear barely sufficed to keep her a-head of the sea. Coal left on arrival at Falmouth was sufficient for about six hours' steaming.

Took in ten tons of coal and left on the morning of the 17th September, for London, calling at Ryde, Isle of Wight. Arrived at Erith about 2 p.m. of the 20th; the counter on the engine showing 8,484,245 revolutions.

The general opinion of the American visitors was that of surprise with decided admiration of the engines and boiler, though the steam pressure shown on the gauge, viz., 540 lbs., the highest worked on the trip, often caused them to make a rush on deck out of the engine-room. The boiler, however, being tested to 2,500 lbs. pressure per square inch, is perfectly safe.

The vessel had a small two-bladed fish-tail propeller, consequently her speed was considerably less than it would have been with a three or four-bladed one.

There was no doubt in the minds of practical men who saw them at work that the Perkins' engine and boiler are the best things of the kind now out.

Our American cousins were keenly alive, not only to the economy of fuel and space as demonstrated, but also to the advantages for naval purposes. Gunboats, with these engines and boilers, could blockade a port for a long period without re-coaling.

As a practical seaman, with experience in large and small

steamers, I should prefer the Perkins' engine and boiler to any other, having seen them tested under very trying circumstances. For marine purposes, a slight raising of the boiler would be advantageous.

October 6, 1880. E. G. DENT.

ON COMPASSES, AND THEIR ADJUSTMENT IN IRON SHIPS.

(*Continued from page* 810.)

IN the formula p. 740 the effect of coefficient E in the several quadrants is as follows:—

Coefficient + E gives + or easterly deviation in the North and South quadrants, and − or westerly deviation in the East and West quadrants. (Fig. 20.)

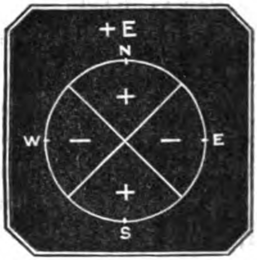


FIG. 20.

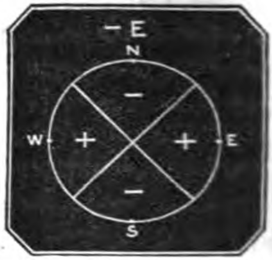


FIG. 21.

Coefficient − E is the reverse of the foregoing, giving − or westerly deviation in the North and South quadrants, and + or easterly deviation in the East and West quadrants. (Fig. 21.)

It may be well to review the totality of the effects of the horizontal soft iron variously distributed around and below or above the compass—now athwartship and undivided, as in the beams, or divided as for a skylight—or now fore and aft, perhaps divided at the position of one compass, and undivided at that of another.

Soft iron, athwartship, like the beams (Fig. 22), passing as it were through the position of the compass, has the effect of *decreasing* the mean *directive force* of the needle, and *producing* a *positive quadrantal* deviation.

FIG. 22.

FIG. 23.

But if the 'thwartship iron be divided, as for a skylight (Fig. 23), the effect is an *increase* of the mean directive force, but a *negative quadrantal* deviation.

Soft iron extending fore and aft (Fig. 24), and passing through the position of the compass, *decreases* the directive force, and produces a *negative quadrantal* deviation.

FIG. 24.

FIG. 25.

But if the fore and aft iron be divided at the position of the compass (Fig. 25), the result is an *increase* of the directive force, and the production of a *positive quadrantal* deviation.

In an iron ship, however, it may be taken that the distribution of the horizontal soft iron will generally partake of a combination of the arrangements already indicated.

Thus, if the soft iron be disposed in the position of Figs. 26 and 27, the directive force would be unaltered, if the effect of the fore and aft iron was such as to neutralise that of the athwartship; or it might be increased or diminished according to the excess of

FIG. 26.

FIG. 27.

one over the other. But 26 would give a large *positive* quadrantal deviation; and 27 a large *negative* quadrantal deviation; as, however, the latter seldom or never occurs, it is to be presumed that the arrangement of iron that gives it is not found in the usual position of any of the compasses.

The arrangement of soft iron shown in Fig. 28 gives an *increase* of directive force, with an amount of quadrantal deviation

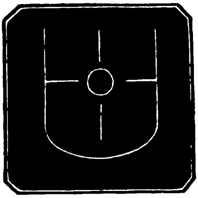


FIG. 28.

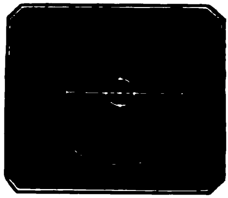


FIG. 29.

depending on the excess of the *positive* over the *negative*; it would generally be very small. The same remark, as regards the deviation equally applies to the arrangement of the soft iron shown in Fig. 29, but in this case there would be a *decrease* of the directive force. The tendency of the disposition of the soft iron magnetised by horizontal induction in the last two cases is, not only to produce quadrantal deviation, but to indirectly affect the amount of the semicircular deviation. Hence the necessity of having a compass not less than four or five feet above all horizontal iron.

It is as well to observe that the term *positive* in these latter remarks means + or E. deviation in the N.E. and S.W. quadrants, and — or W. deviation in the S.E. and N.W. quadrants; *negative* means the reverse.

Though the value of coefficient E is generally so small that it may be disregarded, it is, in exceptional cases, sufficiently large to be an important element in the formula. The coefficient D, almost always positive, attains a high value in some ships, but especially in steamers; it is, however, most remarkable for the *detrimental* effect which the disturbing force that produces it has on the directive force of the needle. Its amount does not depend upon the size of the vessel or on direction when building, but rather on the position [of t]he compass and its surroundings; and from its origin will be [c]*hanging* in all magnetic latitudes.

The coefficient A represents the *constant* deviation, since it appertains to every point of the compass, with the same sign, + or − as the case may be, and with the same value. It is due to a variety of causes; the lubber's line not being exactly in the midship line; bad graduation of a compass; inability to read a compass to minutes of arc; lack of precision in the prism; an index error; an unrecognised difference between the compass on shore and that on board; the correct magnetic bearing of a distant object being only known to the nearest degree, &c. Thus the errors may be partly instrumental, and partly due to observation. They are unlikely to be cumulative, and ought therefore to be small; generally less than 1°. In this sense the A is *apparent* rather than real, and may have different values at different places and times. It is reckoned + when the easterly deviation is in excess, and − when the westerly deviation is in excess.

But there may be a *real* constant, A, with a large value, due to horizontal induction in soft iron placed *unsymmetrically* in respect to the position of two compasses out of the midship line; one such compass being to starboard and the other to port of the elongated end of the iron spindle of the steering wheel. (*See* Fig. 30.) The result will be + A in the starboard compass, and − A in the port compass, since the south ends of the needles must be attracted towards the end of the spindle when the ship heads in any northerly direction, and the north ends of the needle will be similarly attracted when the ship heads in any southerly direction; and this will occur irrespective of change of magnetic latitude. The co-efficient E will also be appreciably affected from the same cause, since A and E are closely connected.

FIG. 30.

A Deviation Curve.—It is not my intention to explain the use of Napier's diagram, which is undoubtedly the best and most simple graphic solution of the deviation problem that has yet appeared, and is on that account not likely to be soon superseded: it requires no calculation—merely the result of observations made on eight nearly equi-distant points—and a moderate degree of neat-handed-

ness in projecting the curve; from this the deviation on any given direction of the ship's head is at once ascertained; also the compass course to steer, for the purpose of making good any required correct magnetic course; and the correct magnetic course made good when any particular compass course is set. It is valued by those who understand it, and is especially useful for rapidly making out *deviation cards* when a ship has been swung.

My purpose is to show the relation of the quadrantal to the semicircular deviation by means of a curvilinear projection. (Fig. 31.) For a good compass, correctly placed in the midship line, the curve due to the semicircular deviation, obtained by plotting the east and west deviations for the various points on different sides of an extended line taken to represent the rim of the compass-card would, if there were no quadrantal deviation, be regular and symmetrical throughout,—in fact, a curve of regular curvature, dividing the compass-rim into two equal parts—one part representing the easterly, and the other the westerly, deviations. This is shown in Fig. 31 by the *thin curve* projected to the left of the straight line between N and S, and to the right between S and N, looking from the upper to the lower end of the diagram. It represents the semicircular deviation of a ship built head North, and hence with – B, *see* table, p. 903. Now, in that table, by the side of – B you will find a + D of 5°, and the effect of this, which is the quadrantal deviation, is (see *thick curve* in Fig.) to diminish the westerly semicircular deviation between N and E, and increase it between E and S; similarly the easterly semicircular deviation between S and W is increased by the quadrantal deviation, and decreased between W and N. Thus the conjoint effect of the two deviations is to give

FIG. 31.

a curve of irregular curvature. Where, by means of magnets, the semicircular deviation has been reduced, the quadrantal deviation will still show on the compass, and be represented by the four *dotted curves*,—to the right between N and E, and between S and W,—to the left between E and S, and between W and N; and this can only be efficiently reduced by soft iron. *Note.*—Fig. 31 slightly exaggerates the curves, to illustrate the subject.

TABLE APPROXIMATELY ILLUSTRATING THE DISTRIBUTION OF THE DEVIATION ACCORDING TO THE DIRECTION OF SHIP'S HEAD WHEN BUILDING.

Ship's Head by Compass.			N.	S.	E.	W.	N.E.	S.W.	N.W.	S.E.
	− B	+ D	Dev.	Dev.	Dev.	Dev.	Dev.	Dev.	Dev.	Dev.
North	0	0	0	0	20° E.	20° W.	12° E.	12° W.	12° W.	12° E.
N.N.E.	7·6° W.	3·5° E.	4° W.	11° E.	22	15	10	3 W.	12	19
N.E.	14·1 W.	5·0 E.	9	19	19	9	5 E.	5 E.	12	22
E.N.E.	18·5 W.	3·5 E.	15	22	11 E.	4 W.	3 W.	10	12	19
East	20·0 W.	0	20	20	0	0	12	12	12	12
E.S.E.	18·5 W.	3·5 W.	22	15	11 W.	4 E.	19	12	10	3 E.
S.E.	14·1 W.	5·0 W.	19	9	19	9	22	12	5 W.	5 W.
S.S.E.	7·6 W.	3·5 W.	11 W.	4 E.	22	15	19	12	3 E.	10
South	0	0	0	0	20	20	12	12	12	12
S.S.W.	7·6 E.	3·5 E.	11 E.	4 W.	15	22	3 W.	10	19	12
S.W.	14·1 E.	5·0 E.	19	9	9	19	5 E.	5 E.	22	12
W.S.W.	18·5 E.	3·5 E.	22	15	4 W.	11 E.	10	3 W.	19	12
West	20·0 E.	0	20	20	0	0	12	12	12	12
W.N.W.	18·5 E.	3·5 W.	15	22	4 E.	11 W.	12	19	3 E.	10
N.W.	14·1 E.	5·0 W.	9	19	9	19	12	22	5 W.	5 W.
N.N.W.	7·6 E.	3·5 W.	4 E.	11 W.	15	22	12	19	10	3 E.
North	0	0	0	0	20 E.	20 W.	12 E.	12 W.	12 W.	12 E.

It is not my purpose in these pages to enter, except incidentally, into the mathematical theory of the deviation of the compass; and this I shall do when concluding the subject in the next number of the *Magazine*. The preceding table computed from assumed coefficients B and C, and with a small assumed + D will give an idea of the character of the deviations in the respective semicircles of the compass according to the magnetic direction of the ship's head when building. The flattening of the curve in one semicircle of the compass, appertaining to ships built N.E., S.W., N.W., and S.E., is especially noteworthy.

W. H. R.

(*To be continued.*)

COAL AND DOCK ACCOMMODATION IN NEW ZEALAND.

THE following communication has been addressed to Mr. Thos. Brassey, M.P., by the Auckland Harbour Board:—

"Harbour Board Offices,
"Auckland, 19th July, 1880.

"I have the honour to inform you that an address delivered by you before the Bradford Chamber of Commerce on the 21st January, 1880, and reported in the *Home News* of 29th January, 1880, has been brought under the notice of the Auckland Harbour Board, and I have been requested, following your remarks in reference to the establishment of coaling stations in these Colonies, to draw your attention to the many facilities offered by the Port of Auckland for the establishment of a coaling station, and also to the natural advantages of this port which renders the providing of dock accommodation adequate to the requirements of Her Majesty's Navy merely a matter of financial adjustment.

"COAL SUPPLY.—In giving the supply of coal now available, I propose alluding to those mines actually in operation, or in which the existence of coal in large quantities has already been determined by the Geological Department up to the year 1877; since then, however, several valuable deposits of coal have been discovered, but mining operations have not yet been entered upon.

"KAWA KAWA COLLIERY, BAY OF ISLANDS, 120 miles north of Auckland by water. This colliery has been at work since 1868, and now produces about 50,000 tons of coal per annum. This quantity will be largely increased when the shipping facilities are improved by means of the extended line of railway to the deep water. The harbour is one of the best in the Colonies, and the navigation free from all obstructions up to the loading ground. The railway is now in course of construction, and will, upon completion, convey the coal to a wharf at which a depth of water 10 feet will be obtained.

KAMO COAL COMPANY, WANGAREI, about 65 miles north of

Auckland by water, has been in operation some time, and a railway is now near completion from the mine to the loading ground; at the terminus there will be a depth of water at low water springs of 22 feet. The navigation to the loading ground is free from any obstructions, and the harbour quite land-locked. On completion of the railway—say within three months from this date—the proprietor will undertake to deliver 500 tons of coal per day, at 10s. per ton.

"WHAU WHAU COAL MINING COMPANY, WANGAREI, about 65 miles from Auckland by water. Present output, about 2,000 tons of coal per annum. Mine not fully at work, capable of producing 100 tons per day easily. The quality of the coal is reported to be next for steam-producing purposes to the Bay of Islands coal. Can be delivered on the completion of the Wangarei railway—say within three months from this date—at loading place, with 22 feet of water at low water springs; price, at loading ground, 10s. per ton. Can deliver 500 tons per day if required. The remarks in reference to harbour at Kamo mine apply to this mine also.

"TAUPIRI COAL MINING COMPANY, WAIKATO, is 65 miles from Auckland by rail. The present output is 1,500 tons per month; but 6,000 tons per month could readily be produced if required. This company are now working a seam of coal 40 feet thick, and have an unlimited supply for 20 years. The coal can be delivered in Auckland at from 15s. to 18s. per ton.

"WAIKATO COAL MINING COMPANY, about same distance from Auckland by rail as Taupiri mine. Present average output 1,600 tons per month; could deliver 600 tons per day if required. Are now working on seam of coal 23 feet thick. The quality of this coal for steam purposes is highly spoken of by the officers of several steamship companies who have used it exclusively.

"BRIDGEWATER (FOOTE'S) MINE, situate about 42 miles from Auckland by water and rail. Now in operation. Output about 800 tons per month; capable of producing 4,000 tons per month. At present working a seam of coal 54 feet thick.

"From the foregoing particulars it will be manifest that the quantity of coals in close proximity to the Port of Auckland is

practically unlimited, and if urgently required the mines above-mentioned are capable of producing about 12,000 tons of coal per week.

"The importance of establishing a coaling-station for Her Majesty's Navy where such a supply of coal could, if required, be available, will be at once apparent; and although it would be a matter of great moment that Her Majesty's Government should be able to avail themselves of this supply, it also becomes a matter of vital importance to the prestige of the British Navy in the Pacific Ocean that no other nation should, in the event of war being declared, have it, even as a matter of possibility, in their power to be able to avail themselves of such a valuable resource as our immense coal-fields and working collieries would provide. It may easily be imagined that in the event of war being declared by the Imperial Government against any power possessing a fleet of steam vessels, and that the enemy wished to injure the British Colonies in the Pacific, the first difficulty that would present itself to them would be coal supply; and in the existing state of affairs here Her Majesty's cruisers on the Australian station being our only defence, a few vessels could with very little difficulty take possession of the Bay of Islands, Whangarei, and Auckland harbour, and avail themselves of the whole of the output of the mines already referred to, and thus possess a coaling-station quite equal to any in the Australian Colonies. If a coaling-station was established in Auckland, Her Majesty's vessels could always readily procure supplies of coal, enabling them to maintain a cruising-ground within a radius of, say, eleven hundred miles from the North Cape of New Zealand, which would effectually prevent an enemy from acquiring the mines referred to, and would protect Fiji and other groups of islands in the South Pacific.

"Auckland is the nearest port to Fiji at which coals could be procured, either for establishing a coaling-station there, or for procuring coal to steam thence.

"In respect to the suitability of Auckland harbour for a coaling-station, it is unrivalled in these seas, either as regards the extent of the harbour or the depth of water, easy of entrance, without obstructions of any kind to navigation, and is said without exaggera-

tion to be capable of affording ample accommodation for the whole of the British fleet.

"2.—DOCK ACCOMMODATION.—The Auckland Harbour Board have already constructed a graving dock 300 feet long, 42 feet broad on the floor, with 14 to 15 feet of water on the sill at high water spring tides. This dock meets all the requirements of the port at present, but would be of little or no use for Her Majesty's vessels. 'The Colonial Docks' Loan Act, 1865,' affirms the expediency of authorising loans by the Imperial Government, in aid of the formation of docks of dimensions greater than would be required for commercial or other private purposes, in order to secure accommodation for vessels of the Royal Navy in British Colonies, but since 1865 no portion of the British possessions has made more progress than New Zealand, and the Colony has therefore passed beyond the stage at which the Act referred to might have been of service, and if it is considered advisable for the unity of the British Empire to protect her colonies in the event of war, it is thought that some fresh legislation should be undertaken to provide means of helping to construct dock accommodation adequate to the requirements of Her Majesty's Navy in such a port as Auckland, where, as already shown, such an ample supply of coal can be obtained, and where, in my opinion, strenuous exertions should be taken to protect such a supply. I quite recognise the fact that suitable dock accommodation must be provided at coaling-stations, and if a coaling-station was established here, suitable dock accommodation must as a consequence be provided. The only difficulty in our case is in respect to funds, every facility required is at hand, water of ample depth, suitable material of every description in any quantities that might be required; the only difficulty being, as I have said, funds. The Board have for some time past been anxiously considering whether means could not be devised to provide funds sufficient to construct a dock of larger size suitable for Her Majesty's Navy, but it is found that the difficulties of the position are much increased by the extra Customs Duties now levied by the General Government, and the Board cannot see their way in the face of this extra taxation to raise the local charges to at least double the

amount now levied, and it is very fairly argued that not only would such action be prejudicial to the best interests of the port, but would be pressing very unduly on the trade of the port for the means of providing Interest and Sinking Fund for the repayment of a loan which might not after all confer advantages at all adequate to the burden levied. I therefore venture to hope that, taking into consideration the undeveloped resources of this Provincial District in 1865, and the altered state of circumstances which now exist, such influence may be brought to bear as would cause the Imperial Government either to amend the 'Colonial Docks' Loan Act, 1865,' by increasing the amount of the loan, or that a new Act may be passed which would meet the altered circumstances of the case more fully.

"I have the honour to be, Sir,

"Your obedient servant,

"D. H. McKENZIE,

"Chairman, Auckland Harbour Board."

LORD SANDON AND THE CONDITION OF SEAMEN.

A PUBLIC meeting was recently held at the offices of the Mercantile Marine Association, Water Street, Liverpool, for the purpose of dissolving the committee appointed to inquire into the condition of merchant seamen, the objects for which it was instituted having now been so largely attained. Mr. C. Bushell, chairman of the committee, presided, and amongst those present were Lord Sandon, Messrs. E. Whitley, M.P.; Thomas Gray, of the Marine Department of the Board of Trade; J. Williamson, A. Balfour, T. H. Ismay, P. Nelson, C. Aspinall, T. R. Shallcross, J. Poole, Captain H. J. Ward, Captain Ballantine, &c.

We cannot afford space for a full account of the proceedings, but the speech of Lord Sandon is so important that we are of opinion it deserves to be recorded in our pages.

Lord Sandon, after some preliminary remarks, said: I wish to ler my humble tribute of honour to the committee whose

death-knell has just been rung. As President of the Board of Trade, though I only held that office rather under two years, I was able to judge of the valuable work which your committee has done; and I have no hesitation in saying that the mercantile marine service owes a deep debt of gratitude to those energetic, persevering, and high-minded men, representing, I believe, the tone and spirit of your noble profession, who got up this committee and have worked so indefatigably upon it. There was also another reason which made me glad to be present on this occasion, and it is this: that I do feel that though we are all strong partisans, and ought to be strong partisans as Englishmen, and to back up our party, still when a Government even that we oppose does what they think for the good of our common country, we ought to take the opportunity of saying that we appreciate that good action however much we disapprove of their action in other respects. That is the true and proper spirit of English political warfare, and though it may be of late years we have not seen a great deal of it, we may hope that in future it will prevail as in days gone by. I am obliged to the Government for having pressed this measure to a conclusion. I own that with regard to the question of legislation for our mercantile marine service I am one of those who are avowedly very shy of legislating for that service. But with regard to the question of unseaworthy sailors, I agree with our friend Mr. Balfour, that it was a matter of such enormous importance to the country as a whole, that legislation was needed on that point; that is to say, for many reasons. Of course there is the moral question involved in the welfare of the seamen which we none of us can overlook, though we may perhaps doubt whether, even for the highest moral reasons, it would be desirable, or in the end successful, to have fresh laws; but still that is not a matter to overlook the moral welfare of any great class of our countrymen. But grouped with these are other questions. There is the interest of the good sailor, who is put in the most terrible position of being associated with bad sailors, a point which is too much overlooked in the discussion of these matters. The good sailor is obliged to do double work, and perhaps ruins his constitution because he is

associated with men who are unfit for their duties either owing to vicious habits or unseamanship. There is another reason which affects the shipowners. What is of more importance than that they should be able to get good staunch crews at a time when they have a very terrible competition to deal with, and, if we look forward to the bounty system, a more terrible competition still? so that it is of the greatest importance that they should get good seaworthy crews. Beyond that all the great commercial communities have the greatest possible interest in the safety of the ships; and the passengers as well are interested, for from all the accounts we see the disasters which have occurred in too many cases can be traced to the unseaworthy sailors. And last of all there is, what appears to me is the greatest reason for legislation, the enormous interest which our great country and empire as a whole has in having a thoroughly good nursery of first-rate seamen to fall back upon in case of a long war. When you group all these reasons together they overcome the reasons against legislation. When I came in to the Board of Trade the year before last, I found that Sir Charles Adderley, who had most thoroughly the interests of the seamen at heart and of the great commercial marine, had introduced a very long Bill on the subject. But I felt confident myself that there was very little chance of a Merchant Shipping Bill of forty or fifty clauses passing in that session. Anyhow, for another reason I had determined that I would not push it on. The great shipping interest was then in a terribly depressed state, and I made up my mind that I would not lift up one finger for legislation at that juncture. I felt that when people were in a highly depressed state you should avoid legislative changes, which would be sure to be irritating and disheartening. So I determined not to effect any legislation in that direction during that year. Now I come to look round upon those points on which we have legislation at the present time; and of course the cardinal point was the abolition of the advance note. I found there was a great difference of opinion about it, and I took pains to consult a number of practical men, not only in my office, but outside in various parts of the country; and I am bound to say that there was much divergence of opinion on the question. Many of the best heads have said

up for the strait. In the S.W. monsoon, after passing Perim, I steer so as to pass Aden about twenty miles off, then I keep away to the eastward about forty miles to the northward of Sokotra; this, I think, is in about the strength of the current; then edge gradually down and pass to the southward of Minikoi, and taking care in steering to sight the Ceylon land to keep well to the southward first, and so avoid an eddy current coming back to the westward in a line with Galle and Minikoi. In the "soft patch" of the monsoon I found little or no current, but about Minikoi a sharp set to the south, which continued till off Cape Comorin.

I have never crossed to Aden direct in the S.W. monsoon, being always in moderately-powered boats, and I take the southern route.

Bound to Rangoon in the N.E. monsoon I make the land about Galle, and stick as close in as I dare go, and so get out of the current; with a large scale chart, and constant cross and four-point bearings, there is no danger. I pass inside the Great Basses reef and a moderate distance south of the little one, then steer well to the eastward and cut through the belt of current which is here about its narrowest, and running like a sluice, then I haul up for the Cocos lighthouse. The first day's run from the Little Basses is usually short and showing a southerly set; the second is better, but still southerly; the third I get a great lift on my journey and make a capital course, then, as I draw in with the Andamans I find a moderate but constant set to the northward which passes onwards and makes the sweep of the Bay of Bengal; where this current and the tide from the Gulf of Martaban meets in the Cocos and Preparis channels, the ripplings are very heavy.

In coming back this way in the fair season I pass close to the Cocos lighthouse and steer straight for the Little Bassés; on getting into the current I keep out from the land from ten to fifteen miles and get the full benefit of it, turning up the 8° channel on passing Galle.

Coming home in the S.W. monsoon I steer down for the Andamans and proceed to the south under cover of them, and usually get a southerly set close in. If the monsoon appears mild I go through the 10° channel and make the best of my way to the S.W.; if it is heavy I make something until it lightens;

•N

then, if it looks favourable and the sea smoothing down I go through the $1\frac{1}{2}°$ channel; if not, I edge away down to 2° south, where I get the S.E. trades and sometimes a favouring current; then I come to the westward, keeping well at the back of the monsoon, until Cape Guardafui bears about N.N.W. (true); I can then head up with all sail set and have something to spare in case of the wind inclining to the westward. If I can sight Ras Hafoon I do it, for I have found that between that and Cape Guardafui the currents are somewhat eccentric, and there is a chance that in steering to give Guardafui a safe berth one is liable to sight Abd-al-Kuri as well.

I once spoiled a good passage to Aden, by being too eager to turn to the northward; the square sails would lift occasionally, and the sea and wind being well on the beam, the runs were poor. Had I held on for another twelve hours to the westward before turning up, the result would have been very different.

I have noticed a sudden drop in the thermometer close to Ras Hafoon in July; it was actually chilly in the mornings.

Another phenomenon I have met with several times to the eastward of Sokotra is a large patch of water which, on a dark night, looks as white as milk, and it would be very difficult to pick up a vessel's starboard light while passing through it.

Crossing the Gulf of Manaar in the N.E. monsoon a good hard breeze is not uncommon, which raises a very nasty sea, but on passing the centre of the Gulf I found the wind draw more to the north, and then lull down altogether as the Ceylon land was approached.

From the middle of May till the middle of June, I have always found a most disagreeable time for squalls and rain crossing the Indian Ocean, and particularly near the islands; but have crossed from Guardafui to Galle and got the sun from latitude almost every day. The clouds may be thick enough for about 60° above the horizon, but above that seemed thinner and so gave chances for the sun at noon, or at least for a good ex-meridian.

I got a most valuable hint from a brother steamboat-master, whose experience, if published, will be prized by many of us; it was this: Put one point of the compass in the east end of Sokotra,

the other 120 miles south of that and describe a circle, and while the south-west monsoon is blowing, carefully avoid getting inside that ring and you are safe.

I have found at times in the S.W. monsoon a very dangerous current setting round the corner at Aden, up towards Ras Sulan. Now I always steer well to the southward of the light if intending to make it at night, and if I do not sight it after running the distance I stop and sound.

In June and July occasional sand storms set in, which obscure the land as completely as a dense fog.

My idea of the south-west monsoon is, that a broad belt of wind advances from the south towards the north, beginning its career slowly, but quickening the pace as it moves to the northward, and that while in advance of it I may have variable winds, with occasional sharp rain squalls, and a heavy swell from S.W. to S.S.E. To the southward of it I should expect light winds, bright weather, and very moderate sea.

Up to the 15th May I would venture across its northern face deeply laden with rice, but between that and the first few days in June would give me the greatest concern as to which route to take. If I went down south I should have a hard fight to get to the Equator, and then should have fresh westerly winds, and sometimes a hard head sea to go against. While leaving in the middle of June, and on to the close of the monsoons, I would quickly cut through the belt, and get finer weather as I advanced southward.

Leaving Rangoon in the beginning of July I would expect S.W. winds and squalls, with moderate sea, until I drew near the south end of the Andamans; then the wind would change to W.S.W., and the full strength of the sea be felt. By the time I got to 4° north, I would expect the wind to be at west and rapidly moderating in force; from that until I ran into the calms it would be flying about between west and south, with occasional squalls; sea very moderate, with occasional rollers high enough to break over the bows.

J. McKIRDY.

APPARATUS FOR ILLUSTRATING LESSONS ON THE DEVIATION OF THE COMPASS IN IRON SHIPS.

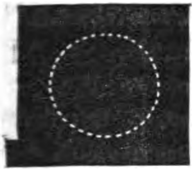
THE well-known experiments with small artificial magnets, iron-filings, &c., illustrate satisfactorily the nature and properties of the subtle force of magnetism; and, as bearing on the magnetism of iron ships, the capital experiment of holding a soft iron rod in the direction of the earth's line of magnetic force until it is magnetised by induction, and fixing this magnetism by a few blows of a hammer, is both instructive and convincing.

I am not aware, however, that anything further has been attempted to aid the teacher in conveying to the student by means of a working model a clearer conception of the various causes which make the mariner's compass deviate from the magnetic meridian; and of the means that have been adopted to neutralise such deviations.

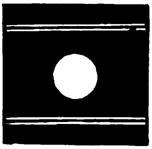
For my public lectures and class-room lessons on this important subject, I devised, some years ago, the simple apparatus of which I subjoin a description, together with brief indications of the means by which it may be made to present to the eyes of the student the effects which, otherwise, would be left to his unaided imagination.

This apparatus consists of three principal parts, a platform, a cradle, and a ship's deck. The platform is of deal an inch thick, and twenty inches square, with a stout batten along one side below to prevent warping, and to secure steadiness when the platform rests on a table. On the upper side is a ring of brass, or of lead, on which run four brass screw-pulleys as wheels, supporting the cradle, which is fourteen inches square, with a knob turning on an upright axis, at an upper corner.

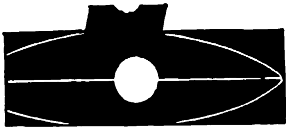
Across the cradle and near to its sides are two parallel battens to support the deck, which is a piece of deal about twenty-seven by nine inches, having the upper corners blackened with Brunswick black, so that the light part is of the form of a ship's deck. Through the centres of the deck and cradle are cut out circular holes of seven inches diameter. The wood is stained, and a dark re-and-aft midship line drawn on the deck.



PLATFORM.



CRADLE.



SHIP.

Supposing the vessel to be of iron, and to have been built with her head S.S.E. on the building slip, a line is drawn in pencil on the model deck through the centre of the circular hole, from the starboard bow towards the port quarter, making an angle of two points with the midship line. This pencil line will show the magnetic axis of the ship so far as the horizontal component of the sub-permanent magnetism of the hard iron of the hull is concerned. On the intersection of this line with the bow fix with gum a circle of blue paper about the size of a shilling, and a red circle where the axis cuts the port quarter. These will represent the magnetic poles in the case supposed. Along this magnetic axis, with its centre on the blue pole and its own south pole inboard, lay a ship's needle wanting the agate cup, to represent the disturbing action of the iron hull on the compass.

It will be convenient to have the ship's compass a little above the plane of the deck, and necessary to keep the pivot on which it rests as firm and steady as possible. To ensure this steadiness the pivot and its support are entirely detached from the moving parts of the apparatus. A heavy tumbler glass nearly filled with sea-sand stands on the platform and rises up an inch above the deck through the circular apertures of the cradle and ship. Into this glass is plunged a sound cork through which a darning needle has been thrust point upwards. More sand is closely packed round so that the cork is firmly fixed. A circle of sheet lead is placed within the rim of the glass, with a hole in its centre for the pivot, and all is secured with paper and gum.

A small hole is made in the centre of a six-inch compass card, and the card slipped over the pivot. The agate cup of a needle being placed on the pivot, and the needle allowed to come to rest, the card below is turned round until its N. and S. points are exactly under those of the needle. The card being kept in this position

enables us to put the ship on any required course, correct magnetic, just as may be done in practice by Friend's Pelorus, or the dumb card, as it is sometimes called.

By means of the knob on the cradle turn the ship slowly round until her head is N.N.W. so that the mutual attraction of opposite poles may cause the compass needle to come to rest in a position of stable equilibrium. Now, turning the ship's head very slowly to the eastward the north end of the needle will be seen to deviate from zero at N.N.W. to the eastward, the deviation at first increasing and then decreasing until the ship's head comes to S.S.E. when it vanishes; and the needle passes quickly over to the westward, the deviation being westerly until it vanishes again when the ship's head returns to N.N.W. When the ship is stopped at any azimuth between the two zero points of deviation, it may be noticed that the needle comes to rest in a line somewhere between the magnetic meridian and the magnetic axis on the deck, thus indicating the direction of the resultant of the magnetic forces of the earth and ship for that position.

If the ship's head be steadied at a sufficient number of equi-distant points, and the deviation read off approximately, a Napier's diagram may be constructed with the readings taken.

If the needle be removed from its pivot, and be replaced by a compass card armed with a needle, the Pelorus itself may be set on the model deck, and the flame of a gas jet being taken to represent the sun at a known azimuth, the method of using the Pelorus at sea may be practically illustrated, or, if eight bearings at equi-distant points of some fixed object are taken by the armed compass, and the correct bearing deduced from the average of the eight, a Napier's curve may be constructed in the usual way.

The disturbing magnet still lying across the starboard bow, the ordinary mode of compensating this part of the semicircular deviation by magnets fixed in the deck may be shown by first putting the ship's head north, thus giving rise to a small easterly deviation due to + C only, and correcting it by laying a ship's needle without an agate cup, athwart ship with its N. pole to starboard.

Next putting the ship's head east, the resulting easterly

deviation is due to + B alone. The breadth of the model deck being insufficient, a piece of wood is pushed into a slit in the batten on the cradle, and across this outrigger a magnet is laid with its N. pole towards the bows and moved until the deviation vanishes.

To illustrate the semi-circular deviation caused by induced magnetism of vertical soft iron, and the mode of correction, two small slits are made through the deck across the midship line on opposite sides of and at equal distances from the compass, and large enough to allow the whole of the needle to pass through. The slits must also be beyond the cradle on each side. Through the hole at the south end of a needle a piece of copper wire is passed, and bent down on both sides just far enough to stop the needle when dropped into the after-slit, so as to clear the platform below and bring the south pole of the vertical needle nearly on a level with the compass.

Having removed the disturbing magnet from the bow, the compass is now only disturbed by the vertical magnet abaft. On rotating the ship a semi-circular deviation due to a − B will be observed. To remove this, drop another needle similarly furnished with a copper-wire stopper into the slit in front, which will represent the soft iron rod usually employed, and the correction will be seen to be effective. For a ship in the southern hemisphere, the N. ends of the magnets must be upwards.

Quadrantal deviation may be shown by placing a flat bar of iron, either fore-and-aft or athwart, and somewhat near to the compass; when the resulting deviation will be seen to vanish at the cardinal points, and to be easterly and westerly in alternate quadrants.

In order to illustrate the effect on the compass of the heeling of an iron ship, a piece of wood is fixed by small brass hinges to each side of the model deck, folding under the deck when horizontal. One of these side wings is lowered and set against the corresponding batten on the cradle. Half a compass card fixed to the stern by drawing pins with the zero point downwards, and with a lead pointer hanging from its centre, acts as a clinometer to show the degree of heeling.

The deviation towards the windward side in the northern

amount now levied, and it is very fairly argued that not only would such action be prejudicial to the best interests of the port, but would be pressing very unduly on the trade of the port for the means of providing Interest and Sinking Fund for the repayment of a loan which might not after all confer advantages at all adequate to the burden levied. I therefore venture to hope that, taking into consideration the undeveloped resources of this Provincial District in 1865, and the altered state of circumstances which now exist, such influence may be brought to bear as would cause the Imperial Government either to amend the 'Colonial Docks' Loan Act, 1865,' by increasing the amount of the loan, or that a new Act may be passed which would meet the altered circumstances of the case more fully.

"I have the honour to be, Sir,

"Your obedient servant,

"D. H. McKENZIE,

"Chairman, Auckland Harbour Board."

LORD SANDON AND THE CONDITION OF SEAMEN.

A PUBLIC meeting was recently held at the offices of the Mercantile Marine Association, Water Street, Liverpool, for the purpose of dissolving the committee appointed to inquire into the condition of merchant seamen, the objects for which it was instituted having now been so largely attained. Mr. C. Bushell, chairman of the committee, presided, and amongst those present were Lord Sandon, Messrs. E. Whitley, M.P.; Thomas Gray, of the Marine Department of the Board of Trade; J. Williamson, A. Balfour, T. H. Ismay, P. Nelson, C. Aspinall, T. R. Shallcross, J. Poole, Captain H. J. Ward, Captain Ballantine, &c.

We cannot afford space for a full account of the proceedings, but the speech of Lord Sandon is so important that we are of opinion it deserves to be recorded in our pages.

Lord Sandon, after some preliminary remarks, said: I wish to tender my humble tribute of honour to the committee whose

death-knell has just been rung. As President of the Board of Trade, though I only held that office rather under two years, I was able to judge of the valuable work which your committee has done; and I have no hesitation in saying that the mercantile marine service owes a deep debt of gratitude to those energetic, persevering, and high-minded men, representing, I believe, the tone and spirit of your noble profession, who got up this committee and have worked so indefatigably upon it. There was also another reason which made me glad to be present on this occasion, and it is this: that I do feel that though we are all strong partisans, and ought to be strong partisans as Englishmen, and to back up our party, still when a Government even that we oppose does what they think for the good of our common country, we ought to take the opportunity of saying that we appreciate that good action however much we disapprove of their action in other respects. That is the true and proper spirit of English political warfare, and though it may be of late years we have not seen a great deal of it, we may hope that in future it will prevail as in days gone by. I am obliged to the Government for having pressed this measure to a conclusion. I own that with regard to the question of legislation for our mercantile marine service I am one of those who are avowedly very shy of legislating for that service. But with regard to the question of unseaworthy sailors, I agree with our friend Mr. Balfour, that it was a matter of such enormous importance to the country as a whole, that legislation was needed on that point; that is to say, for many reasons. Of course there is the moral question involved in the welfare of the seamen which we none of us can overlook, though we may perhaps doubt whether, even for the highest moral reasons, it would be desirable, or in the end successful, to have fresh laws; but still that is not a matter to overlook the moral welfare of any great class of our countrymen. But grouped with these are other questions. There is the interest of the good sailor, who is put in the most terrible position of being associated with bad sailors, a point which is too much overlooked in the discussion of these matters. The good sailor is obliged to do double work, and perhaps ruins his constitution because he is

associated with men who are unfit for their duties either owing to vicious habits or unseamanship. There is another reason which affects the shipowners. What is of more importance than that they should be able to get good staunch crews at a time when they have a very terrible competition to deal with, and, if we look forward to the bounty system, a more terrible competition still? so that it is of the greatest importance that they should get good seaworthy crews. Beyond that all the great commercial communities have the greatest possible interest in the safety of the ships; and the passengers as well are interested, for from all the accounts we see the disasters which have occurred in too many cases can be traced to the unseaworthy sailors. And last of all there is, what appears to me is the greatest reason for legislation, the enormous interest which our great country and empire as a whole has in having a thoroughly good nursery of first-rate seamen to fall back upon in case of a long war. When you group all these reasons together they overcome the reasons against legislation. When I came in to the Board of Trade the year before last, I found that Sir Charles Adderley, who had most thoroughly the interests of the seamen at heart and of the great commercial marine, had introduced a very long Bill on the subject. But I felt confident myself that there was very little chance of a Merchant Shipping Bill of forty or fifty clauses passing in that session. Anyhow, for another reason I had determined that I would not push it on. The great shipping interest was then in a terribly depressed state, and I made up my mind that I would not lift up one finger for legislation at that juncture. I felt that when people were in a highly depressed state you should avoid legislative changes, which would be sure to be irritating and disheartening. So I determined not to effect any legislation in that direction during that year. Now I come to look round upon those points on which we have legislation at the present time; and of course the cardinal point was the abolition of the advance note. I found there was a great difference of opinion about it, and I took pains to consult a number of practical men, not only in my office, but outside in various parts of the country; and I am bound to say that there was much divergence of opinion on the question. Many of the best heads have said

up for the strait. In the S.W. monsoon, after passing Perim, I steer so as to pass Aden about twenty miles off, then I keep away to the eastward about forty miles to the northward of Sokotra; this, I think, is in about the strength of the current; then edge gradually down and pass to the southward of Minikoi, and taking care in steering to sight the Ceylon land to keep well to the southward first, and so avoid an eddy current coming back to the westward in a line with Galle and Minikoi. In the "soft patch" of the monsoon I found little or no current, but about Minikoi a sharp set to the south, which continued till off Cape Comorin.

I have never crossed to Aden direct in the S.W. monsoon, being always in moderately-powered boats, and I take the southern route.

Bound to Rangoon in the N.E. monsoon I make the land about Galle, and stick as close in as I dare go, and so get out of the current; with a large scale chart, and constant cross and four-point bearings, there is no danger. I pass inside the Great Basses reef and a moderate distance south of the little one, then steer well to the eastward and cut through the belt of current which is here about its narrowest, and running like a sluice, then I haul up for the Cocos lighthouse. The first day's run from the Little Basses is usually short and showing a southerly set; the second is better, but still southerly; the third I get a great lift on my journey and make a capital course, then, as I draw in with the Andamans I find a moderate but constant set to the northward which passes onwards and makes the sweep of the Bay of Bengal; where this current and the tide from the Gulf of Martaban meets in the Cocos and Preparis channels, the ripplings are very heavy.

In coming back this way in the fair season I pass close to the Cocos lighthouse and steer straight for the Little Bassés; on getting into the current I keep out from the land from ten to fifteen miles and get the full benefit of it, turning up the 8° channel on passing Galle.

Coming home in the S.W. monsoon I steer down for the Andamans and proceed to the south under cover of them, and usually get a southerly set close in. If the monsoon appears mild I go through the 10° channel and make the best of my way to the S.W.; if it is heavy I make something until it lightens;

then, if it looks favourable and the sea smoothing down I go through the 1½° channel; if not, I edge away down to 2° south, where I get the S.E. trades and sometimes a favouring current; then I come to the westward, keeping well at the back of the monsoon, until Cape Guardafui bears about N.N.W. (true); I can then head up with all sail set and have something to spare in case of the wind inclining to the westward. If I can sight Ras Hafoon I do it, for I have found that between that and Cape Guardafui the currents are somewhat eccentric, and there is a chance that in steering to give Guardafui a safe berth one is liable to sight Abd-al-Kuri as well.

I once spoiled a good passage to Aden, by being too eager to turn to the northward; the square sails would lift occasionally, and the sea and wind being well on the beam, the runs were poor. Had I held on for another twelve hours to the westward before turning up, the result would have been very different.

I have noticed a sudden drop in the thermometer close to Ras Hafoon in July; it was actually chilly in the mornings.

Another phenomenon I have met with several times to the eastward of Sokotra is a large patch of water which, on a dark night, looks as white as milk, and it would be very difficult to pick up a vessel's starboard light while passing through it.

Crossing the Gulf of Manaar in the N.E. monsoon a good hard breeze is not uncommon, which raises a very nasty sea, but on passing the centre of the Gulf I found the wind draw more to the north, and then lull down altogether as the Ceylon land was approached.

From the middle of May till the middle of June, I have always found a most disagreeable time for squalls and rain crossing the Indian Ocean, and particularly near the islands; but have crossed from Guardafui to Galle and got the sun from latitude almost every day. The clouds may be thick enough for about 60° above the horizon, but above that seemed thinner and so gave chances for the sun at noon, or at least for a good ex-meridian.

I got a most valuable hint from a brother steamboat-master, whose experience, if published, will be prized by many of us; it was this: Put one point of the compass in the east end of Sokotra,

the other 120 miles south of that and describe a circle, and while the south-west monsoon is blowing, carefully avoid getting inside that ring and you are safe.

I have found at times in the S.W. monsoon a very dangerous current setting round the corner at Aden, up towards Ras Sulan. Now I always steer well to the southward of the light if intending to make it at night, and if I do not sight it after running the distance I stop and sound.

In June and July occasional sand storms set in, which obscure the land as completely as a dense fog.

My idea of the south-west monsoon is, that a broad belt of wind advances from the south towards the north, beginning its career slowly, but quickening the pace as it moves to the northward, and that while in advance of it I may have variable winds, with occasional sharp rain squalls, and a heavy swell from S.W. to S.S.E. To the southward of it I should expect light winds, bright weather, and very moderate sea.

Up to the 15th May I would venture across its northern face deeply laden with rice, but between that and the first few days in June would give me the greatest concern as to which route to take. If I went down south I should have a hard fight to get to the Equator, and then should have fresh westerly winds, and sometimes a hard head sea to go against. While leaving in the middle of June, and on to the close of the monsoons, I would quickly cut through the belt, and get finer weather as I advanced southward.

Leaving Rangoon in the beginning of July I would expect S.W. winds and squalls, with moderate sea, until I drew near the south end of the Andamans; then the wind would change to W.S.W., and the full strength of the sea be felt. By the time I got to 4° north, I would expect the wind to be at west and rapidly moderating in force; from that until I ran into the calms it would be flying about between west and south, with occasional squalls; sea very moderate, with occasional rollers high enough to break over the bows.

J. McKIRDY.

APPARATUS FOR ILLUSTRATING LESSONS ON THE DEVIATION OF THE COMPASS IN IRON SHIPS.

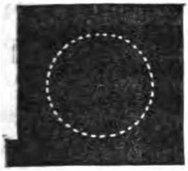
THE well-known experiments with small artificial magnets, iron-filings, &c., illustrate satisfactorily the nature and properties of the subtle force of magnetism; and, as bearing on the magnetism of iron ships, the capital experiment of holding a soft iron rod in the direction of the earth's line of magnetic force until it is magnetised by induction, and fixing this magnetism by a few blows of a hammer, is both instructive and convincing.

I am not aware, however, that anything further has been attempted to aid the teacher in conveying to the student by means of a working model a clearer conception of the various causes which make the mariner's compass deviate from the magnetic meridian; and of the means that have been adopted to neutralise such deviations.

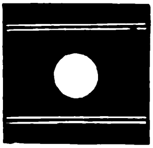
For my public lectures and class-room lessons on this important subject, I devised, some years ago, the simple apparatus of which I subjoin a description, together with brief indications of the means by which it may be made to present to the eyes of the student the effects which, otherwise, would be left to his unaided imagination.

This apparatus consists of three principal parts, a platform, a cradle, and a ship's deck. The platform is of deal an inch thick, and twenty inches square, with a stout batten along one side below to prevent warping, and to secure steadiness when the platform rests on a table. On the upper side is a ring of brass, or of lead, on which run four brass screw-pulleys as wheels, supporting the cradle, which is fourteen inches square, with a knob turning on an upright axis, at an upper corner.

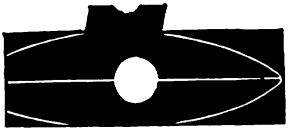
Across the cradle and near to its sides are two parallel battens to support the deck, which is a piece of deal about twenty-seven by nine inches, having the upper corners blackened with Brunswick black, so that the light part is of the form of a ship's deck. Through the centres of the deck and cradle are cut out circular holes of seven inches diameter. The wood is stained, and a dark fore-and-aft midship line drawn on the deck.



PLATFORM.



CRADLE.



SHIP.

Supposing the vessel to be of iron, and to have been built with her head S.S.E. on the building slip, a line is drawn in pencil on the model deck through the centre of the circular hole, from the starboard bow towards the port quarter, making an angle of two points with the midship line. This pencil line will show the magnetic axis of the ship so far as the horizontal component of the sub-permanent magnetism of the hard iron of the hull is concerned. On the intersection of this line with the bow fix with gum a circle of blue paper about the size of a shilling, and a red circle where the axis cuts the port quarter. These will represent the magnetic poles in the case supposed. Along this magnetic axis, with its centre on the blue pole and its own south pole inboard, lay a ship's needle wanting the agate cup, to represent the disturbing action of the iron hull on the compass.

It will be convenient to have the ship's compass a little above the plane of the deck, and necessary to keep the pivot on which it rests as firm and steady as possible. To ensure this steadiness the pivot and its support are entirely detached from the moving parts of the apparatus. A heavy tumbler glass nearly filled with sea-sand stands on the platform and rises up an inch above the deck through the circular apertures of the cradle and ship. Into this glass is plunged a sound cork through which a darning needle has been thrust point upwards. More sand is closely packed round so that the cork is firmly fixed. A circle of sheet lead is placed within the rim of the glass, with a hole in its centre for the pivot, and all is secured with paper and gum.

A small hole is made in the centre of a six-inch compass card, and the card slipped over the pivot. The agate cup of a needle being placed on the pivot, and the needle allowed to come to rest, the card below is turned round until its N. and S. points are exactly under those of the needle. The card being kept in this position

enables us to put the ship on any required course, correct magnetic, just as may be done in practice by Friend's Pelorus, or the dumb card, as it is sometimes called.

By means of the knob on the cradle turn the ship slowly round until her head is N.N.W. so that the mutual attraction of opposite poles may cause the compass needle to come to rest in a position of stable equilibrium. Now, turning the ship's head very slowly to the eastward the north end of the needle will be seen to deviate from zero at N.N.W. to the eastward, the deviation at first increasing and then decreasing until the ship's head comes to S.S.E. when it vanishes; and the needle passes quickly over to the westward, the deviation being westerly until it vanishes again when the ship's head returns to N.N.W. When the ship is stopped at any azimuth between the two zero points of deviation, it may be noticed that the needle comes to rest in a line somewhere between the magnetic meridian and the magnetic axis on the deck, thus indicating the direction of the resultant of the magnetic forces of the earth and ship for that position.

If the ship's head be steadied at a sufficient number of equi-distant points, and the deviation read off approximately, a Napier's diagram may be constructed with the readings taken.

If the needle be removed from its pivot, and be replaced by a compass card armed with a needle, the Pelorus itself may be set on the model deck, and the flame of a gas jet being taken to represent the sun at a known azimuth, the method of using the Pelorus at sea may be practically illustrated, or, if eight bearings at equi-distant points of some fixed object are taken by the armed compass, and the correct bearing deduced from the average of the eight, a Napier's curve may be constructed in the usual way.

The disturbing magnet still lying across the starboard bow, the ordinary mode of compensating this part of the semicircular deviation by magnets fixed in the deck may be shown by first putting the ship's head north, thus giving rise to a small easterly deviation due to + C only, and correcting it by laying a ship's needle without an agate cup, athwart ship with its N. pole to starboard.

Next putting the ship's head east, the resulting easterly

deviation is due to + B alone. The breadth of the model deck being insufficient, a piece of wood is pushed into a slit in the batten on the cradle, and across this outrigger a magnet is laid with its N. pole towards the bows and moved until the deviation vanishes.

To illustrate the semi-circular deviation caused by induced magnetism of vertical soft iron, and the mode of correction, two small slits are made through the deck across the midship line on opposite sides of and at equal distances from the compass, and large enough to allow the whole of the needle to pass through. The slits must also be beyond the cradle on each side. Through the hole at the south end of a needle a piece of copper wire is passed, and bent down on both sides just far enough to stop the needle when dropped into the after-slit, so as to clear the platform below and bring the south pole of the vertical needle nearly on a level with the compass.

Having removed the disturbing magnet from the bow, the compass is now only disturbed by the vertical magnet abaft. On rotating the ship a semi-circular deviation due to a − B will be observed. To remove this, drop another needle similarly furnished with a copper-wire stopper into the slit in front, which will represent the soft iron rod usually employed, and the correction will be seen to be effective. For a ship in the southern hemisphere, the N. ends of the magnets must be upwards.

Quadrantal deviation may be shown by placing a flat bar of iron, either fore-and-aft or athwart, and somewhat near to the compass; when the resulting deviation will be seen to vanish at the cardinal points, and to be easterly and westerly in alternate quadrants.

In order to illustrate the effect on the compass of the heeling of an iron ship, a piece of wood is fixed by small brass hinges to each side of the model deck, folding under the deck when horizontal. One of these side wings is lowered and set against the corresponding batten on the cradle. Half a compass card fixed to the stern by drawing pins with the zero point downwards, and with a lead pointer hanging from its centre, acts as a clinometer to show the degree of heeling.

The deviation towards the windward side in the northern

hemisphere may be shown by attaching a magnet to the high side of the tilted deck, just opposite to the compass, with its south pole upwards. This is readily effected by turning upwards the copper wire in one of the needles used for showing the deviation due to vertical iron, and so hooking the needle on to the higher side of the ship.

With the ship heeling over on either tack, and heading east or west, the representative magnet acts in the magnetic meridian, in conjunction with the earth's force, and causes no deviation; but with ship's head N. or S., the magnet acts at right angles to the earth's force, and the heeling error observed will be greatest.

Suppose the ship beating against an easterly wind. Put the ship on the port-tack heading S.S.E.; hang on the magnet, and observe the deviation; remove the magnet, and put the ship on the starboard tack heading N.N.W.; replacing the magnet on the raised side, the heeling error will be seen to have been easterly in both cases.

Next, suppose the ship beating against a northerly wind. Put the ship on the port-tack heading E.N.E., and observe the deviation. Then, on the starboard tack heading W.N.W., the deviation will be easterly on one tack and westerly on the other, in accordance with the rules.

THOMAS DOBSON, M.A.

Winterbottom Marine School,
South Shields, September 20th, 1880.

THE SHIPMASTERS' SOCIETY.

THE Shipmasters' Society of London is, we are glad to learn, making very satisfactory progress. It has successfully come through the trying period of its youth, and now bids fair to hold its own as a well-established and flourishing institution. It is of course in the hands of the members to keep up the high standard which now characterises the Society, to steer clear of all personal differences, and to avoid the tendency too common among such associations to

degenerate into a mere club for the airing of petty grievances and general grumbling. That the Society is doing good work is unmistakeable, and we sincerely hope it will long continue its course. Through their instrumentality an address was recently presented to Lord Sandon, late President of the Board of Trade, acknowledging the valuable services rendered by his lordship to the merchant service during his term of office, to which the following very gratifying reply has been received:—

"Sandon Hall, Stone, September 15th, 1880.

"B. F. Cramer, Esq.,

"Secretary of the London Shipmasters' Society.

"Dear Sir,—The framed document to which your letter referred has reached me here. I beg you to convey my best thanks to the Shipmasters' Society of London, and to the kindred Societies of Liverpool, Sunderland, Hull, and Leith, for the very gratifying address which they have been so good as to send to me on the subject of the Act respecting the Inquiries into Shipping Casualties, which I had the honour of passing through Parliament last year as President of the Board of Trade.

"For some time before I was connected with the Board of Trade, I had been aware of the deep feeling of dissatisfaction which existed amongst our Mercantile Marine Service with respect to the system under which inquiries into shipping casualties were conducted, and also respecting the judgments of some of the Courts which had held them. I have had reason to know that leading men connected with the shipping of the United Kingdom were so much impressed by the risk to which masters and mates were subjected of having the whole of their professional prospects ruined by the judgments of these Courts, from which there was practically no appeal, that they were dissuading young men, in whom they took an interest, from entering the Merchant Service.

"On becoming President of the Board of Trade, I made it my duty to watch carefully the working of this system, and, after giving myself more than a year, with the advantages my official position afforded for observation and consideration of its effects, I came to the conclusion that it was not only unjust and needlessly offensive to the officers of the Mercantile Marine, but that it would,

most unintentionally on the part of those who framed it and who had administered it, unless promptly reformed, have the effect of lowering the tone and status of that great profession, which it ought to be the aim of all who value the maritime and commercial greatness of our country, to improve and elevate.

"Holding these views, it was a subject of much satisfaction to me, looking to the general interests of the country as well as to the just claims of the Merchant Service, to pass the measure last year to which your address refers. And I rejoice to think that we were able to secure for the future that there should be the right of appeal in all these cases from an inferior to a superior Court; that the Court which is to make the inquiry should no longer select its own assessors; that two at least of the assessors, when certificates may be affected, should be taken from the Mercantile Marine, the appointments of the assessors themselves being at the same time limited to three years (thus securing that the peculiar and ever-changing conditions of our merchant shipping should be fully represented in the Court), and that these inquiries should no longer be connected with the degrading associations of a police-court.

"In order, however, to make certain the complete success of the Act, it was necessary that the mode of appointment of assessors by the Home Secretary should be put by him upon a new and more satisfactory footing, that special qualifications of service, as well as the appointment to each inquiry as far as possible by rotation, should be arranged, and that careful regulations should also be laid down by the Lord Chancellor. I felt that so much depended upon these rules and regulations—which whenever made or changed, as I fixed in the Act, must be laid on the table of Parliament—that I did not hesitate to delay the coming into operation of the Act for a time, so as to put them on a satisfactory footing, which required careful and protracted negociations with the Home Secretary and the Lord Chancellor.

"It now gives me, I confess, great pleasure to know from your address that in the most important ports of the country this legislation has, after experience, been approved by the noble profession you represent, and also to hear from other and different quarters that, while the primary object of securing the public safety is quite

as well provided for under the changes we have made, and while the character of the inquiries is fully maintained and, in some cases, considerably improved, more confidence is felt in the judgments of the Courts, and the whole system of inquiries into shipping casualties is brought more into harmony with the fair and just requirements of the officers of the Merchant Service.

"I have thought it well to place in your hands this statement of my views, and of the reasons for my action, in case hereafter it should be proposed to revert in any way to the former system, by means of either new rules or fresh legislation.

"It only remains for me to request you to assure the Shipmasters' Association of London, and the kindred Societies of the great ports, which have associated themselves with you, how highly I appreciate the kind feeling which has led them to communicate to me their satisfaction with my action in this matter, and how much I admire and value the beautiful parchment with its graceful and artistic illuminations, which has been the medium of conveying to me the gratifying expressions of their friendly sentiments.—I remain, dear Sir,

"Your very faithful servant,

"SANDON."

CORRESPONDENCE.

ISLE OF WIGHT PILOTAGE.

To the Editor of the "Nautical Magazine."

SIR,—The pilot authorities of the Isle of Wight have made a rule that all the pilot boats not on station should remain in port and not cruise at sea as pilots from other ports do.

The consequence of this rule is that you can only get a pilot when close to the Needles or Nab Lights, when you do not want one, and when you complain you are told you have to look for one. Now all we have to do is not to let you slip past. Coming up channel when the weather is thick, a pilot off Portland (where they used to be) would be of great use, as he would know where he was.

As we have to pay for a pilot whether we want him or not, I think it hard we cannot get one where he would be of some use. Most of the masters coming to Southampton do not want a pilot when they have made the Needles, but in most cases would be glad of one off St. Albans, when they have not made anything.

The Falmouth pilots are often to the westward of Scilly, Plymouth ones off the Lizard, Havre pilots off the Start, &c. Why the Isle of Wight pilots, when not on station, should be obliged to remain in port is more than I can understand. The men do not like it, and say that the ones that won't work are just as well off as those that will.—I am, Sir, your obedient servant,

SHELLBACK.

[Our correspondent is misinformed. No rule of the kind referred to has been made; in fact, the regulations provide that no cutter shall remain in harbour unnecessarily. As regards cruising, the arrangements are that at each of the following stations a cutter shall be continually on the look-out:—Between Peverell and Christchurch; between Christchurch and the Needles; inside the Needles; between the Needles and St. Katherine's; between St. Katherine's and the Princessa Shoal; between the Princessa Shoal and the Owers; and inside the Princessa.—Ed. *N. M.*]

BOOKS RECEIVED.

Return of Wrecks and Casualties in Indian Waters for the Year 1879; with Chart, &c. Prepared by Robert C. Carrington, F.R.A.S., &c., Registrar of Wrecks, Marine Survey Department, Calcutta. 1880.

From this Return we observe that during the year under review 289 wrecks and 192 casualties occurred on the coasts of India, and that 357 lives were lost in consequence, by far the largest number of losses which have hitherto been recorded as occurring in any one year in Indian waters. A very large proportion of the disasters occurred to native craft, and this fact forms the subject of some very strong remarks by Mr. Carrington, who hails with tisfaction the advent of the Indian Merchant Shipping Act, 1880.

based upon the English Merchant Shipping Act of 1876, by which some of the old unseaworthy vessels may be condemned; but as vessels under 150 tons are excluded, Mr. Carrington is of opinion that the most numerous class of dangerous vessels will thus be unaffected, and he strongly advocates the extension of the Act to such vessels. Mr. Carrington also calls attention to the necessity for some protection for the Lascars against native owners; to the need for some reform in regard to the surveying of ships, which is to some extent provided in the new Act; to the unsatisfactory operation of Courts of Inquiry into shipping disasters, urging greater stringency and less sentiment in dealing with masters who lose their ships; and lastly, he has much to say against what he terms the "defective and misleading system of carrying side lights," and he advocates a system proposed by Mr. Bradford Leslie, C.E., of carrying a strong white light on the stem or bowsprit, and one on the foremast for sailing vessels, and, for steam vessels, the same lights, but with the addition of an intermediate light between the two. Mr. Carrington also alludes to the probable establishment of lighthouses on Cape Guardafui and Ras Hafoon, on the N.E. coast of Africa.

The Wreck Returns are carefully drawn up, and some memoranda of weather experienced at the various ports round India will probably be found useful by navigators frequenting the localities in question.

A Voyage in the "Sunbeam." By Mrs. Brassey. Adapted for School and Class-reading. London: Longmans. 1880.

THE object of this reprint is most commendable. We have no doubt that the volume will be a most welcome substitute in many schools for the uninteresting reading books generally used. The information given is just that which will agreeably and unconsciously instruct young people in geographical knowledge, and will tend to open their minds by giving them some useful ideas respecting the people who dwell in other parts of the world.

Aids to the Study and Forecast of the Weather. By W. Clement Ley, M.A. Published by authority of the Meteorological Council. London: J. D. Potter, 31, Poultry; and Stanford, 55, Charing Cross. 1880.

A careful study of this little work will enable anyone to follow with intelligence the information published in the daily press, and to become a meteorological observer on his own account. The name of the author is a sufficient guarantee of the value of the work, and its publication by authority of the Meteorological Council attests in what estimation it is held by those most learned in weather knowledge. We may add that the author has adopted a simple and intelligible style, which makes it easy to read and comprehend, that it is full of information, and that the chapter on clouds, which is Mr. Clement Ley's speciality, is most admirably written. The book is enriched by two well executed charts of the mean pressure and prevailing winds in January and July all over the world. The cost of this book is one shilling, and it certainly is well worth the money.

The New Rules of the Road at Sea Explained and Illustrated. By J. G. Moore and P. E. Le Conteur, Nautical School, Canning Place, Liverpool. London: Geo. Philip and Son, 32, Fleet Street. Liverpool: Philip, Son and Nephew, South Castle Street. 1880.

The compilers of this little work are actuated by a praiseworthy desire to assist candidates for certificates of competency in obtaining a proper knowledge of the subjects upon which they are to be examined, and in the publication now before us they do their best to make the new Rules of the Road clear and intelligible to the maritime beginner. We do not propose to criticise the labours of the compilers beyond saying that the plan of explanation appears to be effective and easy of comprehension; it being in fact the reproduction in simple language of some of the cases generally set before pupils or candidates for certificates, with concise explanations, free from all ambiguities. The authors state that they have avoided all hair-splitting distinctions, and have taken the broadest and most practical view of the subject, consistent with accuracy. In such a work as this, such a course is unquestionably the right one, and as one instance of how this plan is followed out, we may quote the following:—

"In considering what constitutes the difference between a ship ...se hauled and one going free it is necessary to draw the line

somewhere, and notwithstanding that it may clash with preconceived opinions on this point, the most careful consideration leads to the conclusion that for all practical purposes a ship with the wind a-beam may be considered a close-hauled ship ; and this interpretation, while it will in no case lead to error, will make several cases clear, which on the other supposition, viz., that a ship with the wind a-beam is a ship going free, have been exceedingly ambiguous and unsatisfactory."

A Short Treatise on the Stowage of Grain. By Mr. G. A. Laws.

THIS consists merely of five diagrams illustrative of various methods of stowage of grain, and a very short description of each on the page opposite to it. Spite of its brevity, this small pamphlet is a useful contribution to the question of the carriage of grain at sea. The first diagram shows the midship section of a steamer, of which it is remarked :—" The depth of hold in this vessel is 25 feet, and rather exceeds the average proportion of depth to breadth in such vessels, but has been purposely fixed upon in this case, as representing a steamer which has actually run in the trade, carrying bulk cargoes with perfect safety for the last ten years." As a matter of fact, the ratio of depth to breadth in this case is ·74, and our readers will appreciate the full force of the writer's remark when it is remembered that in the *Marlborough*, although the co-efficient was said by the Wreck Commissioner to be a very high one, it yet was only ·7. In the second diagram the arrangements are shown for a cargo of grain from the Black Sea. These consist of shifting-boards in the 'tween-decks and downwards as far as the hold-beams only, and four planks of the lower deck are taken up all fore-and-aft to allow the 'tween-deck grain to feed through into the lower hold. We may remark that this arrangement is in contravention of the Act of last Session which comes in force on the 1st January, 1881. After that date, all vessels carrying grain on the Atlantic must have shifting-boards from deck to keelson, and must have the 'tween-deck grain in bags, except when it " is carried in properly constructed feeders." Whether the whole of the 'tween-decks in Mr. Laws' arrangement does or does not become a properly constructed feeder is a moot point, and perhaps the question may hereafter serve as an illustra-

tion of the difficulties of legislating upon the details of the carriage of grain. Diagram 3 shows the Montreal system of loading grain, the whole of the 'tween-decks in bulk and three tiers of bags in the upper part of the lower hold resting upon deals. With this is contrasted in diagram 4 the system approved by the North of England Association, in which the midship part of the 'tween-decks forms a feeder and is filled with grain in bulk, except that at the top there are two tiers of bags resting on deals. The whole of the 'tween-decks, between the feeders and the ship's sides, is filled with grain in bags. The recent Act is framed so as to allow of either of these plans being adopted, but the latter is discouraged at present by the underwriters' regulations at North American ports. Although there are fewer bags used, the latter plan is certainly the best, and indeed the main objects of all grain stowage should be firstly to fill up all space as nearly as possible, and secondly to keep it filled. The recent Act is far less restrictive than proposals for legislation which have been advocated from time to time; we cannot think that even it will be allowed to remain a permanent settlement of the question, but that some means will be devised whereby any system of safe stowage will be legalised.

Das Schwimmende Flottenmaterial der Seemächte von J. F. von Kronenfels. Wien, Pest, Leipzig. A. Hartleben. 1880.

We have received the second and third parts of this useful work. The former is taken up with a description of the English Navy with illustrations of the more important vessels. An immense deal of information about all our war ships, from the *Inflexible* of 11,000 tons to gunboats of 400 tons displacement, is compressed into a small space, and the author has been able to do this by rigidly confining himself to description; keeping clear of even such enticing topics of controversy as the *Inflexible's* stability. In the third part we have the navies of France, Greece, Italy, Japan, Holland, and Norway. The ships of greatest interest are the monster Italian ironclads, and the large vessels in course of construction for the French Navy, of which some admirable woodcuts are given. Another part is required to complete the work, which will then contain a store of information about the war ships of the world such as has not hitherto been obtainable in a single book.

to me, " You may abolish it, but it will be evaded, and you will have it back again in another form." Another party referred to the shock it might be to the seamen. But on the whole I came to the conclusion that it was better to make that change—effect the abolition of the advance note—and to try it. The other points I took a considerable time to consider, because I always feel that when you are in office you are bound to consult a great number of people outside before you legislate, and I concluded in the middle of last year that some such Bill as you have now seen passed should be pushed through Parliament. It was obviously impossible to pass my measure owing to the obstruction we then suffered under. On the first night of this session I produced a Bill, which I prepared with great care, called " The Conditions of Service, Merchant Seamen Bill," which touched on these points:—It provided for the abolition of the advance note, or the prompt payment of the seaman's wages when he returned at the end of his engagement, a very important matter; it provided for the rate of A.B. being only given after four years' sea service, also a very important matter; and it provided for certain amendments as to crimps on board ship. It provided, also, for power to the court to rescind contracts made between masters and apprentices and so on, and it touched upon those two important points. I was determined that nothing would induce me to abolish summary arrest without warrant. I believe that to be of the greatest importance to the shipowner, and also to the good seaman, whose great interest it is that he should not at the last moment have a worthless substitute shipped on board because the men are drunk. I have always felt that the question of summary arrest was of great value to the good seaman, almost more than to the shipowner, so I did not touch that. It provided to substitute fine for imprisonment, and that men should only be imprisoned on non-payment of fines. It also provided that the local authority should have the power to register and inspect lodging-houses. That Bill I introduced as soon as the new Parliament met—in fact, in the same half-hour that the Government introduced the Bill they called the Payment of Seamen's Wages Bill. I was extremely interested in comparing the two Bills together, and a good number of people

whom I consulted about them were also much interested at finding that the Bill which came under the new name not only did not contain anything more than my Bill, but contained the first five clauses, and left out the substitution of fines for imprisonment, and took no notice of the local authority and the registering of lodging-houses. The two Bills ran side by side, my Bill being the longer one and the Government Bill being the shorter one, because they did not treat on the two subjects I have named. I kept my Bill running alongside the Government Bill until it came up for second reading, and then I was glad to see that legislation was safe, and I dropped my measure, but I took good care that the two subjects I cared for should not be dropped. I therefore brought in an amendment to put in the inspection of seamen's lodging-houses by the local authorities, and also the substitution of fines for imprisonment. You will see how that measure has been built up, and how it has gone through Parliament. There has been addition after addition, and the clause about lodging-houses, which was embodied, I find was the one written by my own hand, and there was added to it a clause about allotment notes—which the Social Science Association proposed—and one with regard to the arrest without warrant, putting seamen in the same position and on the same footing as people are under the Employers and Workmen's Act. I approved of the Government Bill with the exception of that clause, but I suspended my judgment upon it, and if it works well no one will rejoice more than I shall do at its success. I told the President of the Board of Trade at the time that I must suspend my judgment upon it, and I went so far as to see the chairman of the Shipping Association of the United Kingdom, and the representatives of the shipping interests in Liverpool, and I asked them if they were aware of the bearing of that clause, because I thought it a dangerous clause, and I was prepared to debate it in the House of Commons; but they said no; they were afraid of worse things, and they hoped I would let it go. Therefore I am not responsible for that great change. There the matter rests; and we shall all rejoice if this Act tends to raise the seaman, as I believe it will, and a great deal of credit and gratitude will be due to this committee which we have met here to-day to dissolve, and to thank

and congratulate for their good work. For my own part my reward is sufficient to see enacted a measure which I brought forward, and to have it mentioned in the Queen's Speech as one of the seven achievements of Her Majesty's Government. Allusion has been made to the transmission of wages scheme, and I would like to confirm what has been said by Mr. Shallcross. It is working very well. It was first started by my predecessor, Sir Charles Adderley, for the port of London. Its object is, that a seaman as soon as as he lands should be able to go straight home to his own port, and receive his wages there, instead of hanging about the port of landing, getting into all sorts of trouble. That was drawn up by some of the excellent heads of the Board of Trade, and I bear testimony to the unwearying labours of Mr. Gray, Mr. Swanston, and other heads of the department. It was originally drawn up in the Marine Department, and Sir C. Adderley, with wonderful effect, put under it "the port of London." A period of only about two years has elapsed, and 2,313 men last year transmitted their wages to their own ports in this way. They had gone to their ports and have drawn their money amounting to £32,000, and we have heard from all quarters, as well as from London, of the very improved attitude of the sailor. Last year I was so much pleased about this that I sent the kind officials at the head of the Marine Department to Liverpool, Dundee, Cardiff, Leith, Bristol, and other places to try and start similar operations there. In Cardiff, Dundee, Leith, and Falmouth, I am glad to say, it is working well and with great chances of success, and in Bristol preparations are made to start the scheme. As you are all assembled with the anxious desire to do good to the seaman, I am sure you will be glad to hear of the success of that scheme, and I can only say how glad I am to join with you in honouring this excellent committee whose good work has come to an end.

TONNAGE ADMEASUREMENT.

IN our August number we dealt with the subject of Tonnage Admeasurement, offering what we considered "an important suggestion thereupon," and we trust that our representations, together with those of the harbour and dock authorities, shipowners, and others concerned in the matter, may have had some influence in drawing official attention to the necessity for reform in regard to the operation of the present tonnage laws. We now are much gratified in recording the issue of a Royal Commission to enquire into the subject, and would add our opinion that the gentlemen selected appear to be eminently qualified for the purpose, and will certainly have the confidence of the entire shipping community.

The following are the terms of the Royal Command :—

"Whereas We have deemed it expedient that a Commission should forthwith issue to inquire into the present operation of the law for the measurement of tonnage, and to report to Us whether the principle of the present law is fully and properly carried into effect, and whether the terms of the present rules are suitable to the present state of shipbuilding, and to report whether the law is fair in its operation as between those who pay and those who receive dues on shipping, and as between the different classes of those who pay such dues; and to report whether, having regard to the great changes which have taken place in the character of merchant ships, there are any defects in the form, the build, or the user of such ships which can be traced to the present law of tonnage, or which any amendment of that law would remedy; and to report whether, having regard to just principles of taxation, to the convenience and furtherance of trade, to international arrangements, and above all to safety, it is desirable to make any and what alteration in such law:

"Now know ye that We, reposing great trust and confidence in your ability and discretion, have nominated, constituted, and appointed, and do by these presents nominate, constitute, and appoint, you, the said Charles Morgan Norwood, Sir John Stokes, Sir Edward James Reed, Henry Cadogan Rothery, Thomas Gray,

James Corry, Robert Capper, John Glover, Thomas Dyson Hornby, William Pearce, Thomas Bland Royden, and Barnard Waymouth to be Our Commissioners for the purposes of the said Inquiry:

"And for the purpose of enabling you Our Commissioners, to make the said inquiries, We do hereby authorise you and empower you, or any three or more of you, to invite all such persons as you may judge most competent by reason of their situation, knowledge, or experience to afford you correct information on the subject of this inquiry, to attend before you and bring with them all such books, documents, papers, accounts, &c., as may appear to you, or any three or more of you, calculated to assist you in the execution of the trust hereby reposed in you:

"And We will and command that this Our Commission shall continue in full force and virtue, and that you, the said Commissioners, or any three or more of you, may from time to time proceed in the execution thereof and of every matter and thing therein contained, although the same be not continued from time to time by adjournment:

"And for your assistance in the execution of these presents, We do hereby authorise and empower you to appoint a Secretary to this Our Commission to attend you, whose services and assistance We require you to use from time to time as occasion may require.

"Given at Our Court at *St. James's*, the eleventh day of October, one thousand eight hundred and eighty, in the forty-fourth year of Our Reign.

"By Her Majesty's Command,

"W. V. HARCOURT."

GLASGOW TO RANGOON.

IF a number of steamship masters who have had considerable experience running out to ports in India and China, via the Suez Canal, would write a faithful account of their voyages to and from the east in the different months, we should have a most valuable addition to our sailing directories.

We all want something of the kind, and yet we are too apathetic to set about it. Each has ideas of his own what course to pursue, and pursues it, sometimes making excellent running, at others lamenting that he had not stuck to the straight line, and so have avoided a great deal of worry and annoyance on finding that his theory is incorrect.

I beg to relate my own experiences, in the hope that others will follow, and add something to our common stock of information.

I am master of a steamer running betwixt Glasgow and Rangoon, and have been for a number of years.

The vessel loaded, we come down the river, and proceed to Gourock Bay, or the Gareloch Head, for compass adjustment. A very short time suffices for this as everybody is anxious to get away, we on board to save as much daylight as possible down channel; those bound for the shore to catch the first train for Glasgow, so the swinging is often times a bit of a farce.

The assistant adjuster is landed with his compass and tickets, and the ship anchored pretty close in, with one anchor, and say, 30 fathoms of chain. The tugs are clapped on, one a-head and one a-stern, and the points taken after a very short steady. The tide may be strong, and both tugs are put astern, and so she is dragged round, varying a-head or a-stern as she is acted upon by the tide, and in a short time the job is complete.

The adjuster hurries up with his cards, and hands them over, hoping sincerely they may turn out correct. I accept them with the mental reservation to trust none of them implictly, excepting those between south and west, as great attention is paid to that quadrant, for it is the one wanted to take the ship out of channel.

I put two dots on the chart—one, quarter-of-a-mile off Cloch lighthouse, the other half-a-mile off Cumbrae lighthouse—and connect them, see what is the correct magnetic course betwixt them, and and the deviation. Get under weigh and round the Cloch, so as "No this line, and set the course by standard compass. If the your ab clear and I can see the Cumbrae, so much the better, appointed, ll at a glance if the deviation is correct on this course, appoint, yom thankful, for it is the one which will take me down Sir Edwardart of the channel.

After passing Cumbrae, Holy Island, Ailsa Craig, and Corsewall, I steer so as to bring the South Rock light-vessel a-beam about three miles off, then I keep down along the Irish lightships, preferring this side to the other as it is more free from traffic, and more numerous chances are afforded for verifying the position ; besides, one can keep a better run of the tides also. the outsets and indrafts are not so great as opposite.

I watch the tides about Port Patrick carefully, as the floods from the North and Irish Channels meeting just below, sometimes affect the ship considerably, particularly if the wind is from the northward or southward, by prolonging the one and cutting the other.

Having taken a four-point bearing of Tuskar, I set my course across the Bay of Biscay for a spot west (true) from Finisterre lighthouse, distant 25 miles. If the weather is moderate, and I make the course straight, I alter it as soon as I see the Spanish land to south (true), so as to pass from 12 to 14 miles off the lighthouse.

I dread this corner, as there is always in rough weather a nasty confused sea about it, and if the wind is blowing from the westward further north, there is a strong outset along the land, and if it is from the west or south-west at the Cape, a smart indraft.

These currents are often very bewildering, coming out when I think they should be going in, and *vice versa.*

I make it a point to give this corner a wide berth and so get a more regular sea, and have no fear of being drawn into danger. Altering the course to south (true), takes me outside the Burlings. Passing them I still keep on till Cape Roca is a-beam, then alter the course for St. Vincent, making a fair allowance for heeling error on these southerly courses, if the wind is fresh and the ship laying over.

If I get a chance to correct my compass, well and good, but it may be that, rolling heavily, I have doubts as to the accuracy of the azimuths ; if so, I have a further chance by the north star at night, which will be right a-stern coming down to Da'Roca.

ave usually found the winds off Spain and Portugal either down the coast, and have heard them spoken of as the ıguese trades." Crossing the Bay of Biscay with a north-y breeze it is almost sure to lead down the coast, and

coming from the southward with a S.E. or S.W. wind it will lead up. I have seen it once, in the summer time, blowing right on shore, but it was only a moderate breeze, and the weather was beautiful. I have noticed that if the weather is changing from fine to bad, the sky remains clear long after the barometer has begun to go down, say with a S.W. or S.E. breeze coming on, the glass indicates an approaching disturbance, the wind pipes up and the sea rises, then small clouds begin to fly, getting bigger every minute until rain falls, and the sky gets quickly overcast, with heavy rain at intervals. When it is going to fly to the N.W. a harder squall and a heavier shower seem to usher in the change. The barometer springs up a little, then stops, and as the squall moderates a thin patch is seen to the N.W., which quickly develops, and soon the sky is cleared, possibly to become partially overcast again. Now the barometer is rising briskly, and the sea goes down as quickly as it rose; two or three hours will raise or allay a good heavy squall.

There appears to be a perpetual swell coming from the westward, summer or winter, sunshine or storm. Any time I have passed up or down this coast it has been here, sometimes long and low; at other times high and hollow, but always perceptible, and often a nuisance; for, running down with a north wind and accompanying sea, the two meeting makes a ship very uncomfortable.

Generally speaking, I notice that from whatever quarter the wind may come, the sky keeps clear as long as the breeze is light to moderate in force, but if it freshens it becomes overcast at once; blowing fresh from S.W. to N.W. I may get a blink of the sun for sights, but a strong breeze away by N.E. round to the southward means a grey coating of clouds all over the sky. In approaching Cape St. Vincent it is painful to think how like a flock of sheep steamboat masters are. We go "follow my leader" round the Cape, as close to it as we can decently squeeze, fearful that we may cover fifty yards of unnecessary water on our voyage.

I think outward-bounders should keep outside a little, seeing they have the current to help them down to the straits, and let the homeward-bounders, who have been coming up under the Spanish land, get the inside berth.

Has not everyone of us some story to tell, of how, homeward-bound one voyage, creeping close in between Tagus and St. Vincent, we saw one red light after another, and had to port for the lot of them when we could ill afford the room, and found by the time we had passed the batch, we were dangerously close to the little rock off the point? For, by some wonderful freak, when one steamer is sighted, you may either look for three or six!

Now there is a sudden change to be made in the course, from southerly to easterly, and very great care is requisite that I start with the correct deviation. If the sun is out I like to try three or four azimuths, at intervals, keeping in mind the rule that the new course errs in the direction of the old one, and also keeping in mind my resolution when I took over the deviation cards.

I think a good deal depends on the placing of the standard compass for its subsequent performances, as I have been in two steamers whose channel course took me right out to Malta without a change, but in others which showed a marked change at St. Vincent and again at Malta.

Having got the deviations, I like to keep a trifle over towards the Spartel side; this gives a stronger current and takes us clear of most of the homeward traffic, and when I have run the distance I haul to the eastward, so as to pass about three miles south of Tarifa, then draw to the northward and pass Europa Point about the same distance off.

I try as far as possible to give all vessels a good wide berth in the Straits, as the ripplings sometimes put it out of my power to control the ship with the rudder.

On getting Europa Point a-beam, my next course is to a spot twenty-five miles south (true), from De Gata lighthouse; this keeps me still in the current. Then I draw over to the African side and close with the land about Cape Tenez, say, four miles off; then, if the weather appears settled and the winds light, I keep along the coast, passing four or five miles off the points, by this I generally get a good help from the current going to the eastward. Passing Cape Bougeoroni I keep down to go well inside the South Rocks, checking the running by the lights at night, and then keep out for Cape Serrat, and the Rocks Fratelli, and pass outside of the Dog

Rocks. I have tried outside and inside Galita, but with varying success, and am inclined to think inside is the best.

In this journey from Cape Tenez to the Dog Rocks, a breeze from the northward might render it dangerous coasting along close in if it came on to blow hard, and again, if there was a strong breeze from the eastward it would be equally imprudent, as the sea running against the current would make such a jumble that I would risk losing all I gained, and maybe more.

Coming home again from the Dog Rocks, I keep away outside of Galita and a long way off the African land sighting Cape Palos, and closing with the Spanish land at Cape De Gata, running along the shore in the eddy current until off Malaga, then edge out so as to make the rock a-head, round Europa Point close, and give the Pearl Rock a good berth, draw in again and pass Tarifa about one mile off, then steer west (true) till well clear of the Cabyos Rocks, and haul up for St. Vincent. If hazy, I take an occasional cast of the lead; if clear, keep a look-out aloft for Cape St. Mary light. If I sight the light from the bridge I know I am too close in, and keep out a little; if not, I go on and make St. Vincent a-head.

The winds and weather in this part of the journey are well described in the books of directions, more particularly that relating to the straits.

I have come down from St. Vincent to Cape Spartel with a strong breeze of S.W. wind blowing, but did not find a particle of current setting to the N.E. I allowed for it, but made the course steered exactly; this, however, may be the exception to the rule.

Sometimes I have noticed that under certain conditions of the atmosphere the lights about the straits will show a long way beyond their limits; this is sometimes very embarrassing. One is apt to feel elated at having made a capital run, and perhaps be thrown off your guard; and, after sighting the light from the deck, go to the standard compass and take its bearing, lay it down on the chart and alter the course, only to find later on you have been misled, and have to keep back again.

The winds from Gibraltar to Cape Bon in ordinary weather, I have noticed, are generally moderate in force, and variable. If it comes on to blow it does not last for any length of time (unless it

sets in for a regular tack of bad weather); it may spoil one, or possibly two days runs, but often helps to make up for the loss by a breeze from the opposite quarter. In the winter and spring months particularly, but generally all the year round, before a gale of wind springs up from the westward, I have noticed that the sky has a most peculiar gauzy appearance about it, sun unnaturally bright, and what clouds there are of the kind we call "mare's tails;" land very clear and distinct, and looking closer, too, than it really is. The barometer gives lots of warning, going slowly but steadily down, then stops; it may come on with a squall from west, or W. by S. Once started it gathers force rapidly, and raises a heavy sea, the sky becomes overcast, and showers of rain, hail, or sleet fall, according to the season, wind likely veering from W. by S. to N.W. After a tack of this the wind will likely settle at W.N.W. for a while, and the sky become perfectly clear of clouds, but the wind howls louder than ever. This may last for some hours, then the barometer drops a little and it dies out, or else it may go round to the north with a rising barometer and settle into fine weather.

A northerly gale crossing the Gulf of Lyons gives bright weather, great masses of white clouds about like blasts of steam from a steamer's pipe, a heavy sea and a high barometer, rising higher the harder it blows, and which may keep on rising till the gale blows itself out; if it drops a trifle the breeze soon comes to an end. Westerly winds appear to be the most tenacious in this part of the Mediterranean.

After passing the Dog Rocks and keeping away for Port Said, I am guided by the way the wind is blowing in setting my course. If blowing fresh from the N.W. I shall expect a considerable current sweeping round by Cape Bon towards the S.E., and I keep well to windward of Pantellaria. By the time it is a-beam there may not be much trace of a current, but betwixt that and Gozo it will set with considerable force and will set me to leeward of the island unless I keep well up, but if the wind hauls to the westward, then the current pushes me straight on.

If I am going to signal at Malta, I do not care about running too close in shore, as I believe there is an eddy current from

Valetta to Gozo, within about a mile or a mile and a-half of the shore. If it is dark passing the islands I keep well out from them, and get the full benefit of the current running to the E.S.E.; this will likely get weaker a day's sail past Malta, and gradually vanish.

If the weather is moderate I don't look for any more currents until drawing in with the Egyptian land about Bourlos, when sometimes I get a sharp set along the coast towards Damietta, by which I may be pushed outside the radius of Bourlos light altogether.

A wild gale of wind can spring up in this part of the Mediterranean, more especially in the winter time, and it is generally with a sigh of relief that I enter Port Said or Malta, feeling thankful I am once more across it.

Drawing near the Egyptian land, if there be any taint of a southerly wind, the barometer falls quickly, black clouds form up in that quarter, and maybe vivid lightning, then a burst of heat, and perhaps sand or dust will come along, and the barometer will rise as soon as the squall strikes the ship.

I like to pick up the Egyptian coast about Damietta, as it is easy enough to pick up the Port Said lightship if it comes on thick, by the soundings, but if unsuccessful in sighting anything I anchor till it clears up.

I find a marked difference in my deviations between Cape Bon and Port Said, and I have to be very careful all the way watching them change. About 100 miles from Port Said they appear to have taken on their new form, and then I swing the ship for the south and east points to take me down the Red Sea; I find they need little or no alteration again till about Sokotra Island.

In going through the Canal I amuse myself checking those got outside, as far as possible; going through the lakes gives good chances, and if anchored in the Great Bitter Lake, by steaming the ship round her anchor I get as many as I want.

On getting out at Suez I go down the gulf on the old time-honoured courses, by whom first planned I do not know. From ...htship I steer south (true) eighteen miles, then I alter the ... for a spot two miles off Ras Gharib, from that again to a

spot about three miles off the centre of Shadwan; this takes me out of the gulf in three courses, and well clear of danger. I find a good guide leaving Suez is to steam down towards the lightship, notice how she is riding, stream the log as we pass, and set the course south (true); if the course is right the eastern face of the Aboderage Hills will be right a-head, and the low land terminating in the cape will be visible on the port bow. If it is night when I start and cannot see the land, I check the course by the north star, which should be right a-stern. Then, when the western brow of the Aboderage land is fair on the starboard beam, or west (true), I have run the eighteen miles, and alter the course. This land-mark is always visible on the darkest night. In daylight I keep a good look-out for the little spit out of Ras Aboderage; I have seen it from aloft, the water is pale green over it; it helps as a check to the running. I take a four-point bearing of Zafarana light, and the same of Ras Gharib, and alter the course for the Shadwan spot when the latter is a-beam. I get another check at Ashrafi, and I keep a good look-out as I near Shadwan that I do not get close to Shab-abu-Nahas.

After a very hot day I have noticed, shortly after the lights were lit in the lighthouses on shore, that they sometimes showed far beyond their limits, having on one occasion had Ras Gharib and Zafarana in sight together, but when the dew began to fall they shrank back to their legitimate limits.

I find that a fair wind in the Gulf of Suez does not help a ship much; the breeze may be strong, all sail set, and a big sea blustering up under the stern, leading us to suppose we are going at a great speed; we get the benefit of anything due to the tide, and possibly half-a-knot for the wind, but nothing more. This, I think, must be the water rushing back on the surface against the wind.

If I set my course at the Shadwan spot to pass two miles to the eastward of the Brothers, I generally make them a-head, or a little on the port bow; if I keep on this course still to pass well to the westward of the Daedalus I find on sighting it I am still further than I expected to be; the same drifting to the westward goes on till about midway between the Daedalus and St. John's, and then

I find a reaction has set in and I am borne back to the eastward a little. I watch this set carefully but do not alter the course for it unless it is strong, as I have found again and again that it will come all right as I get further down.

When I came into the Red Sea first I used to find out most extraordinary currents; now that I understand it better I am less afflicted in this respect.

From St. John's Island to Jibbel Tir the course is usually undisturbed, unless it may come on a fresh breeze from either side; while it is blowing I may find a set with the wind, but not for long, for it recovers and sets against the wind, especially when it is lulling down.

The remarks on the winds and weather, as described in the "Red Sea Pilot," are really splendid; they ease one's mind very much going up and down.

I have steered a course day after day between Shadwan and Jibbel Tir, upon which I knew there was little or no deviation, and yet I got easterly deviation upon it in the morning and westerly in the evening; it never exceeded 0° 35′ either way, but still it happened daily; it must have been caused by the sun beating on the one side of the ship nearly all day while the other was cool, so that the rising azimuth, when the temperature of the ship was alike all over, would be the correct one.

From Jibbel Tir to the Quoin Rock is but a short distance, yet between these two runs the nastiest current I have met with in the Red Sea. I have heard that the Zebayers were placed five miles to the westward of truth, and I have been told by an old pilot that there is a regular ebb and flood in the vicinity of the Zebayers running two knots an hour. I believe both these stories are incorrect, and that the sharp set to the eastward is caused by the current from the Straits of Perim setting over towards the Abyssinian coast, which glancing off at an angle, crosses the sea betwixt the Zebayers and Jibbel Tir.

I have passed Jibbel Tir, distant four miles, set a course to pass one and a-half mile to the westward of Centre Peak Island, found by steering this apparently safe course I was drawn dangerous proximity to the Quoin Rock, then I kept out,

and out until I was a-beam of Centre Peak Island, and determined to be on the safe side, set the course to go through between Aboo Aile Island and High Island, by steering for the western edge of Jibbel Zughur, and made its western edge exactly, and had to haul away back to the eastward.

Now in coming down on passing Jibbel Tir, three miles distant, I haul to the southward for a spot about seven miles to the westward of Centre Peak Island, and by the time it is a-beam I am about one mile and a-half off, then I steer straight for Aboo Aile Island, and make it a-head; I find I am set back as well as pushed to the eastward coming down to Centre Peak Island, and helped on between that and Zughur. In the strength of the N.E. monsoon, when the wind is blowing up the sea strong, I like to keep well to windward.

This current I have met with all the year round, strongest in the N.E. monsoon, but well defined in the S.W. also. After passing through the islands I make two courses down to the Straits of Perim, passing about seven miles off the town of Mocha; if it is the N.E. monsoon and a strong wind blowing up, I draw in towards the Arabian land, and get smoother water and less current, and coming out again close to the Straits pass through.

In passing up or down the Red Sea, I have noticed that the breeze is pretty constant up the sea between Perim and Jibbel Tir from September to April; strongest during the strength of the monsoon; in the remaining months it is variable, and, if I get the southerly wind away above Jibbel Tir, I look for a hard breeze to steam against all the way to Perim; if the breeze only meets me about, or a little below, Jibbel Tir, I expect to get a lull under the lee and along the shores of Zughur, with the wind recommencing at its old strength after passing the south end of the island, and so continuing to Perim.

In the northern part of the sea, if I get into a strong northerly wind about St. John's Island, I expect to get a break between the Daedalus and the Brothers, which may let me right up to Suez with light winds (unless it be in the months of June, July, or August, when it may blow strong all the way from Suez to Perim), but if I only get it between the Daedalus and the Brothers, I expect to

keep a hard head wind right up to the anchorage, and when steaming in smooth water I meet a swell coming along, I know I shall get into the wind raising it a few hours after.

In the early spring and the beginning of the winter months I have had thunder and lightning with heavy rain, and squally weather in the vicinity of the islands and to the northward of them.

In November, December, January, February, and March, as soon as I clear the straits, I point the ship's head for Meyet Island on the African coast, and keep on that course until I get below the parallel of 12°, then I expect to be getting out of the current going towards the strait, and to get less wind than I had further north. If I find I am running up to the patent log I steer away east (true); this gives me a help from the eddy current going towards the east.

On nearing Ras Filuk I expect it to get much stronger ; then I haul to the northward to pass Filuk close to, and immediately get into the western current again. If it is daylight I coast along close in by Ras Aluleh, and so on to Guardafui ; if dark, I keep a little further off, but generally find when daylight comes in I am further off the African coast than I expected to be, and am being set up bodily to the northward between the islands as well as kept back. If the wind be at all free I make as much as I can of the fore-and-aft canvas.

After passing Sokotra I find the current setting from the N.E., there it draws more on the beam, and eventually abaft—helping me onward as I near Minikoi. But it suddenly stops short in a line with the islands, and I find on passing through I have a set to the northward, which alters to N.W., and eventually west, as I draw in with the land at Galle. The reverse happens about April, when the south-west monsoon is at hand, and all through that monsoon.

In coming home again these same months I pass south of Minikoi, and if meaning to sight it guard against the sharp set to the north which might easily put a steamer ashore, then I steer for Abd-al-Kuri and on nearing it keep away so as to pass ten or twelve miles off Guardafui, and the same distance of Ras Aluleh.
n keep west (true) on that parallel till past Aden, and then keep

TIDE TABLES FOR NOVEMBER, 1880.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M.	London Bridge. P.M.	Hull. A.M.	Hull. P.M.	North Shields A.M.	North Shields P.M.	Leith. A.M.	Leith. P.M.	Devon-port. A.M.	Devon-port. P.M.	Dover. A.M.	Dover. P.M.	Weston Super-Mare. A.M.	Weston Super-Mare. P.M.	Liver-pool. A.M.	Liver-pool. P.M.	Green-ock. A.M.	Green-ock. P.M.	Queens-town. A.M.	Queens-town. P.M.	Kings-town. A.M.	Kings-town. P.M.	London-derry. A.M.	London-derry. P.M.	Brest. A.M.	Brest. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
M	1	0 23	0 44	4 53	5 13	1 53	2 12	0 47	1 7	4 4	4 26	9 32	9 54	5 12	5 35	9 47	10 7	10 29	10 51	3 23	3 44	9 40	9 59	6 28	6 49	2 12	2 32
Tu	2	1 5	1 26	5 33	5 54	2 31	2 50	1 27	1 47	4 47	5 8	10 16	10 37	5 58	6 21	10 27	10 47	11 13	11 35	4 6	4 28	10 18	10 37	7 10	7 31	2 52	3 13
W	3	1 45	2 6	6 16	6 38	3 9	3 29	2 7	2 27	5 29	5 50	11 0	11 24	6 44	7 6	11 8	11 30	11 57	—	4 50	5 12	10 57	11 18	7 51	8 10	3 34	3 55
Th	4	2 25	2 47	7 0	7 22	3 50	4 13	2 47	3 8	6 12	6 34	11 48	—	7 28	7 50	11 53	—	0 19	0 41	5 35	5 58	11 41	—	8 30	8 51	4 17	4 39
F	5	3 8	3 31	7 44	8 7	4 36	5 0	3 30	3 54	6 56	7 19	0 13	0 39	8 12	8 34	0 16	0 39	1 5	1 29	6 21	6 45	0 4	0 28	9 13	9 36	5 2	5 26
S	6	3 53	4 17	8 31	8 55	5 25	5 50	4 19	4 44	7 42	8 5	1 5	1 31	8 56	9 18	1 2	1 26	1 53	2 17	7 9	7 33	0 54	1 20	9 59	10 24	5 50	6 15
S	7	4 40	5 5	9 20	9 47	6 16	6 44	5 11	5 40	8 28	8 52	1 57	2 23	9 40	10 3	1 51	2 17	2 41	3 6	7 57	8 22	1 46	2 14	10 53	11 28	6 41	7 9
M	8	5 32	6 0	10 16	10 50	7 14	7 46	6 10	6 43	9 19	9 48	2 50	3 17	10 27	10 53	2 43	3 12	3 32	4 0	8 50	9 18	2 43	3 13	—	0 7	7 38	8 9
Tu	9	6 29	7 2	11 26	—	8 22	9 0	7 18	7 54	10 20	10 54	3 46	4 16	11 22	11 56	3 44	4 18	4 31	5 3	9 48	10 21	3 47	4 24	0 50	1 34	8 41	9 17
W	10	7 36	8 13	0 4	0 41	9 40	10 19	8 32	9 12	11 30	—	4 47	5 19	—	0 33	4 55	5 38	5 37	6 14	10 58	11 38	5 1	5 37	2 17	2 56	9 56	10 36
Th	11	8 50	9 32	1 17	1 52	10 56	11 31	9 50	10 24	0 9	0 48	5 54	6 29	1 11	1 48	6 20	6 57	6 51	7 27	—	0 14	6 12	6 45	3 30	4 0	11 14	11 49
F	12	10 6	10 40	2 25	2 56	—	0 2	10 55	11 23	1 23	1 57	7 3	7 35	2 24	2 58	7 30	8 0	8 1	8 32	0 48	1 21	7 16	7 45	4 26	4 48	—	0 20
S	13	11 12	11 41	3 25	3 52	0 29	0 54	11 48	—	2 29	2 56	8 4	8 30	3 31	4 2	8 27	8 51	9 1	9 28	1 52	2 20	8 13	8 40	5 10	5 32	0 48	1 14
S	14	—	0 7	4 17	4 40	1 17	1 39	0 11	0 33	3 21	3 46	8 54	9 17	4 30	4 57	9 13	9 34	9 52	10 15	2 44	3 8	9 5	9 28	5 53	6 14	1 37	1 59
M	15	0 29	0 51	5 1	5 21	1 59	2 19	0 54	1 15	4 9	4 31	9 40	10 2	5 21	5 44	9 54	10 14	10 37	10 59	3 31	3 53	9 49	10 7	6 35	6 56	2 20	2 40
Tu	16	1 14	1 34	5 41	6 1	2 38	2 57	1 35	1 54	4 52	5 11	10 23	10 44	6 6	6 27	10 34	10 53	11 20	11 41	4 13	4 33	10 25	10 43	7 17	7 37	3 0	3 19
W	17	1 53	2 11	6 21	6 44	3 15	3 33	2 13	2 31	5 30	5 48	11 4	11 24	6 46	7 5	11 12	11 30	—	noon	4 52	5 11	11 1	11 18	7 54	8 10	3 37	3 55
Th	18	2 29	2 46	6 58	7 16	3 50	4 8	2 48	3 5	6 5	6 22	11 43	—	7 23	7 40	11 48	—	0 19	0 37	5 29	5 47	11 36	11 54	8 26	8 42	4 13	4 30
F	19	3 3	3 20	7 34	7 51	4 26	4 44	3 22	3 38	6 38	6 53	0 2	0 21	7 57	8 13	0 6	0 24	0 55	1 13	6 5	6 22	—	0 12	8 58	9 14	4 47	5 4
S	20	3 37	3 55	8 8	8 25	5 2	5 20	3 56	4 14	7 9	7 25	0 40	0 59	8 29	8 45	0 41	0 57	1 30	1 47	6 39	6 57	0 30	0 48	9 30	9 47	5 21	5 38
S	21	4 13	4 30	8 43	9 2	5 38	5 57	4 33	4 52	7 41	7 57	1 18	1 37	9 1	9 17	1 14	1 32	2 4	2 22	7 15	7 33	1 7	1 26	10 5	10 24	5 56	6 15
M	22	4 47	5 5	9 21	9 41	6 16	6 37	5 11	5 33	8 13	8 31	1 56	2 16	9 34	9 51	1 51	2 10	2 40	2 59	7 51	8 9	1 46	2 7	10 46	11 13	6 35	6 56
Tu	23	5 24	5 45	10 2	10 25	6 59	7 23	5 56	6 20	8 52	9 14	2 36	2 57	10 8	10 27	2 30	2 51	3 19	3 40	8 29	8 51	2 29	2 51	11 42	—	7 18	7 41
W	24	6 8	6 31	10 52	11 22	7 50	8 19	6 46	7 14	9 37	10 2	3 19	3 42	10 49	11 13	3 14	3 40	4 3	4 27	9 14	9 38	3 15	3 42	0 12	0 46	8 6	8 32
Th	25	6 56	7 24	11 53	—	8 49	9 21	7 44	8 16	10 30	10 59	4 6	4 32	11 40	—	4 8	4 38	4 52	5 20	10 4	10 35	4 12	4 43	1 21	1 58	9 0	9 32
F	26	7 53	8 25	0 24	0 55	9 56	10 31	8 49	9 25	11 33	—	5 0	5 30	0 11	0 44	5 12	5 50	5 51	6 25	11 10	11 45	5 15	5 47	2 33	3 3	10 8	10 44
S	27	9 2	9 38	1 27	1 58	11 3	11 33	9 57	10 27	0 11	0 49	6 0	6 31	1 17	1 50	6 28	7 0	6 59	7 31	—	0 18	6 18	6 47	3 36	4 8	11 18	11 50
S	28	10 10	10 42	2 28	2 57	—	0 2	10 55	11 23	1 24	1 58	7 3	7 35	2 24	2 58	7 31	8 1	8 2	8 32	0 50	1 22	7 16	7 45	4 27	4 49	—	0 20
M	29	11 12	11 39	3 25	3 52	0 29	0 55	11 49	—	2 29	2 58	8 4	8 31	3 31	4 3	8 28	8 52	9 1	9 29	1 52	2 21	8 13	8 41	5 11	5 33	0 48	1 15
Tu	30	—	0 6	4 18	4 42	1 18	1 41	0 13	0 37	3 26	3 58	8 57	9 23	4 33	5 2	9 16	9 39	9 55	10 20	2 48	3 14	9 8	9 38	5 55	6 19	1 40	2 4

coming from the southward with a S.E. or S.W. wind it will lead up. I have seen it once, in the summer time, blowing right on shore, but it was only a moderate breeze, and the weather was beautiful. I have noticed that if the weather is changing from fine to bad, the sky remains clear long after the barometer has begun to go down, say with a S.W. or S.E. breeze coming on, the glass indicates an approaching disturbance, the wind pipes up and the sea rises, then small clouds begin to fly, getting bigger every minute until rain falls, and the sky gets quickly overcast, with heavy rain at intervals. When it is going to fly to the N.W. a harder squall and a heavier shower seem to usher in the change. The barometer springs up a little, then stops, and as the squall moderates a thin patch is seen to the N.W., which quickly develops, and soon the sky is cleared, possibly to become partially overcast again. Now the barometer is rising briskly, and the sea goes down as quickly as it rose ; two or three hours will raise or allay a good heavy squall.

There appears to be a perpetual swell coming from the westward, summer or winter, sunshine or storm. Any time I have passed up or down this coast it has been here, sometimes long and low ; at other times high and hollow, but always perceptible, and often a nuisance ; for, running down with a north wind and accompanying sea, the two meeting makes a ship very uncomfortable.

Generally speaking, I notice that from whatever quarter the wind may come, the sky keeps clear as long as the breeze is light to moderate in force, but if it freshens it becomes overcast at once ; blowing fresh from S.W. to N.W. I may get a blink of the sun for sights, but a strong breeze away by N.E. round to the southward means a grey coating of clouds all over the sky. In approaching Cape St. Vincent it is painful to think how like a flock of sheep steamboat masters are. We go "follow my leader" round the Cape, as close to it as we can decently squeeze, fearful that we may cover fifty yards of unnecessary water on our voyage.

I think outward-bounders should keep outside a little, seeing they have the current to help them down to the straits, and let the homeward-bounders, who have been coming up under the Spanish land, get the inside berth.

Has not everyone of us some story to tell, of how, homeward-bound one voyage, creeping close in between Tagus and St. Vincent, we saw one red light after another, and had to port for the lot of them when we could ill afford the room, and found by the time we had passed the batch, we were dangerously close to the little rock off the point? For, by some wonderful freak, when one steamer is sighted, you may either look for three or six!

Now there is a sudden change to be made in the course, from southerly to easterly, and very great care is requisite that I start with the correct deviation. If the sun is out I like to try three or four azimuths, at intervals, keeping in mind the rule that the new course errs in the direction of the old one, and also keeping in mind my resolution when I took over the deviation cards.

I think a good deal depends on the placing of the standard compass for its subsequent performances, as I have been in two steamers whose channel course took me right out to Malta without a change, but in others which showed a marked change at St. Vincent and again at Malta.

Having got the deviations, I like to keep a trifle over towards the Spartel side; this gives a stronger current and takes us clear of most of the homeward traffic, and when I have run the distance I haul to the eastward, so as to pass about three miles south of Tarifa, then draw to the northward and pass Europa Point about the same distance off.

I try as far as possible to give all vessels a good wide berth in the Straits, as the ripplings sometimes put it out of my power to control the ship with the rudder.

On getting Europa Point a-beam, my next course is to a spot twenty-five miles south (true), from De Gata lighthouse; this keeps me still in the current. Then I draw over to the African side and close with the land about Cape Tenez, say, four miles off; then, if the weather appears settled and the winds light, I keep along the coast, passing four or five miles off the points, by this I generally get a good help from the current going to the eastward. Passing Cape Bougeoroni I keep down to go well inside the South Rocks, checking the running by the lights at night, and then keep out for Cape Serrat, and the Rocks Fratelli, and pass outside of the Dog

Rocks. I have tried outside and inside Galita, but with varying success, and am inclined to think inside is the best.

In this journey from Cape Tenez to the Dog Rocks, a breeze from the northward might render it dangerous coasting along close in if it came on to blow hard, and again, if there was a strong breeze from the eastward it would be equally imprudent, as the sea running against the current would make such a jumble that I would risk losing all I gained, and maybe more.

Coming home again from the Dog Rocks, I keep away outside of Galita and a long way off the African land sighting Cape Palos, and closing with the Spanish land at Cape De Gata, running along the shore in the eddy current until off Malaga, then edge out so as to make the rock a-head, round Europa Point close, and give the Pearl Rock a good berth, draw in again and pass Tarifa about one mile off, then steer west (true) till well clear of the Cabyos Rocks, and haul up for St. Vincent. If hazy, I take an occasional cast of the lead; if clear, keep a look-out aloft for Cape St. Mary light. If I sight the light from the bridge I know I am too close in, and keep out a little; if not, I go on and make St. Vincent a-head.

The winds and weather in this part of the journey are well described in the books of directions, more particularly that relating to the straits.

I have come down from St. Vincent to Cape Spartel with a strong breeze of S.W. wind blowing, but did not find a particle of current setting to the N.E. I allowed for it, but made the course steered exactly; this, however, may be the exception to the rule.

Sometimes I have noticed that under certain conditions of the atmosphere the lights about the straits will show a long way beyond their limits; this is sometimes very embarrassing. One is apt to feel elated at having made a capital run, and perhaps be thrown off your guard; and, after sighting the light from the deck, go to the standard compass and take its bearing, lay it down on the chart and alter the course, only to find later on you have been misled, and have to keep back again.

The winds from Gibraltar to Cape Bon in ordinary weather, I have noticed, are generally moderate in force, and variable. If it comes on to blow it does not last for any length of time (unless it

sets in for a regular tack of bad weather); it may spoil one, or possibly two days runs, but often helps to make up for the loss by a breeze from the opposite quarter. In the winter and spring months particularly, but generally all the year round, before a gale of wind springs up from the westward, I have noticed that the sky has a most peculiar gauzy appearance about it, sun unnaturally bright, and what clouds there are of the kind we call "mare's tails;" land very clear and distinct, and looking closer, too, than it really is. The barometer gives lots of warning, going slowly but steadily down, then stops; it may come on with a squall from west, or W. by S. Once started it gathers force rapidly, and raises a heavy sea, the sky becomes overcast, and showers of rain, hail, or sleet fall, according to the season, wind likely veering from W. by S. to N.W. After a tack of this the wind will likely settle at W.N.W. for a while, and the sky become perfectly clear of clouds, but the wind howls louder than ever. This may last for some hours, then the barometer drops a little and it dies out, or else it may go round to the north with a rising barometer and settle into fine weather.

A northerly gale crossing the Gulf of Lyons gives bright weather, great masses of white clouds about like blasts of steam from a steamer's pipe, a heavy sea and a high barometer, rising higher the harder it blows, and which may keep on rising till the gale blows itself out; if it drops a trifle the breeze soon comes to an end. Westerly winds appear to be the most tenacious in this part of the Mediterranean.

After passing the Dog Rocks and keeping away for Port Said, I am guided by the way the wind is blowing in setting my course. If blowing fresh from the N.W. I shall expect a considerable current sweeping round by Cape Bon towards the S.E., and I keep well to windward of Pantellaria. By the time it is a-beam there may not be much trace of a current, but betwixt that and Gozo it will set with considerable force and will set me to leeward of the island unless I keep well up, but if the wind hauls to the westward, then the current pushes me straight on.

If I am going to signal at Malta, I do not care about running too close in shore, as I believe there is an eddy current from

Valetta to Gozo, within about a mile or a mile and a-half of the shore. If it is dark passing the islands I keep well out from them, and get the full benefit of the current running to the E.S.E.; this will likely get weaker a day's sail past Malta, and gradually vanish.

If the weather is moderate I don't look for any more currents until drawing in with the Egyptian land about Bourlos, when sometimes I get a sharp set along the coast towards Damietta, by which I may be pushed outside the radius of Bourlos light altogether.

A wild gale of wind can spring up in this part of the Mediterranean, more especially in the winter time, and it is generally with a sigh of relief that I enter Port Said or Malta, feeling thankful I am once more across it.

Drawing near the Egyptian land, if there be any taint of a southerly wind, the barometer falls quickly, black clouds form up in that quarter, and maybe vivid lightning, then a burst of heat, and perhaps sand or dust will come along, and the barometer will rise as soon as the squall strikes the ship.

I like to pick up the Egyptian coast about Damietta, as it is easy enough to pick up the Port Said lightship if it comes on thick, by the soundings, but if unsuccessful in sighting anything I anchor till it clears up.

I find a marked difference in my deviations between Cape Bon and Port Said, and I have to be very careful all the way watching them change. About 100 miles from Port Said they appear to have taken on their new form, and then I swing the ship for the south and east points to take me down the Red Sea; I find they need little or no alteration again till about Sokotra Island.

In going through the Canal I amuse myself checking those got outside, as far as possible; going through the lakes gives good chances, and if anchored in the Great Bitter Lake, by steaming the ship round her anchor I get as many as I want.

On getting out at Suez I go down the gulf on the old time-honoured courses, by whom first planned I do not know. From the lightship I steer south (true) eighteen miles, then I alter the course for a spot two miles off Ras Gharib, from that again to a

spot about three miles off the centre of Shadwan; this takes me out of the gulf in three courses, and well clear of danger. I find a good guide leaving Suez is to steam down towards the lightship, notice how she is riding, stream the log as we pass, and set the course south (true); if the course is right the eastern face of the Aboderage Hills will be right a-head, and the low land terminating in the cape will be visible on the port bow. If it is night when I start and cannot see the land, I check the course by the north star, which should be right a-stern. Then, when the western brow of the Aboderage land is fair on the starboard beam, or west (true), I have run the eighteen miles, and alter the course. This land-mark is always visible on the darkest night. In daylight I keep a good look-out for the little spit out of Ras Aboderage; I have seen it from aloft, the water is pale green over it; it helps as a check to the running. I take a four-point bearing of Zafarana light, and the same of Ras Gharib, and alter the course for the Shadwan spot when the latter is a-beam. I get another check at Ashrafi, and I keep a good look-out as I near Shadwan that I do not get close to Shab-abu-Nahas.

After a very hot day I have noticed, shortly after the lights were lit in the lighthouses on shore, that they sometimes showed far beyond their limits, having on one occasion had Ras Gharib and Zafarana in sight together, but when the dew began to fall they shrank back to their legitimate limits.

I find that a fair wind in the Gulf of Suez does not help a ship much; the breeze may be strong, all sail set, and a big sea blustering up under the stern, leading us to suppose we are going at a great speed; we get the benefit of anything due to the tide, and possibly half-a-knot for the wind, but nothing more. This, I think, must be the water rushing back on the surface against the wind.

If I set my course at the Shadwan spot to pass two miles to the eastward of the Brothers, I generally make them a-head, or a little on the port bow; if I keep on this course still to pass well to the westward of the Daedalus I find on sighting it I am still further than I expected to be; the same drifting to the westward goes on till about midway between the Daedalus and St. John's, and then

I find a reaction has set in and I am borne back to the eastward a little. I watch this set carefully but do not alter the course for it unless it is strong, as I have found again and again that it will come all right as I get further down.

When I came into the Red Sea first I used to find out most extraordinary currents; now that I understand it better I am less afflicted in this respect.

From St. John's Island to Jibbel Tir the course is usually undisturbed, unless it may come on a fresh breeze from either side; while it is blowing I may find a set with the wind, but not for long, for it recovers and sets against the wind, especially when it is lulling down.

The remarks on the winds and weather, as described in the "Red Sea Pilot," are really splendid; they ease one's mind very much going up and down.

I have steered a course day after day between Shadwan and Jibbel Tir, upon which I knew there was little or no deviation, and yet I got easterly deviation upon it in the morning and westerly in the evening; it never exceeded 0° 35′ either way, but still it happened daily; it must have been caused by the sun beating on the one side of the ship nearly all day while the other was cool, so that the rising azimuth, when the temperature of the ship was alike all over, would be the correct one.

From Jibbel Tir to the Quoin Rock is but a short distance, yet between these two runs the nastiest current I have met with in the Red Sea. I have heard that the Zebayers were placed five miles to the westward of truth, and I have been told by an old pilot that there is a regular ebb and flood in the vicinity of the Zebayers running two knots an hour. I believe both these stories are incorrect, and that the sharp set to the eastward is caused by the current from the Straits of Perim setting over towards the Abyssinian coast, which glancing off at an angle, crosses the sea betwixt the Zebayers and Jibbel Tir.

I have passed Jibbel Tir, distant four miles, set a course to pass one and a-half mile to the westward of Centre Peak Island, and found by steering this apparently safe course I was drawn to dangerous proximity to the Quoin Rock, then I kept out,

and out until I was a-beam of Centre Peak Island, and determined to be on the safe side, set the course to go through between Aboo Aile Island and High Island, by steering for the western edge of Jibbel Zughur, and made its western edge exactly, and had to haul away back to the eastward.

Now in coming down on passing Jibbel Tir, three miles distant, I haul to the southward for a spot about seven miles to the westward of Centre Peak Island, and by the time it is a-beam I am about one mile and a-half off, then I steer straight for Aboo Aile Island, and make it a-head; I find I am set back as well as pushed to the eastward coming down to Centre Peak Island, and helped on between that and Zughur. In the strength of the N.E. monsoon, when the wind is blowing up the sea strong, I like to keep well to windward.

This current I have met with all the year round, strongest in the N.E. monsoon, but well defined in the S.W. also. After passing through the islands I make two courses down to the Straits of Perim, passing about seven miles off the town of Mocha; if it is the N.E. monsoon and a strong wind blowing up, I draw in towards the Arabian land, and get smoother water and less current, and coming out again close to the Straits pass through.

In passing up or down the Red Sea, I have noticed that the breeze is pretty constant up the sea between Perim and Jibbel Tir from September to April; strongest during the strength of the monsoon; in the remaining months it is variable, and, if I get the southerly wind away above Jibbel Tir, I look for a hard breeze to steam against all the way to Perim; if the breeze only meets me about, or a little below, Jibbel Tir, I expect to get a lull under the lee and along the shores of Zughur, with the wind recommencing at its old strength after passing the south end of the island, and so continuing to Perim.

In the northern part of the sea, if I get into a strong northerly wind about St. John's Island, I expect to get a break between the Daedalus and the Brothers, which may let me right up to Suez with light winds (unless it be in the months of June, July, or August, when it may blow strong all the way from Suez to Perim), but if I only get it between the Daedalus and the Brothers, I expect to

keep a hard head wind right up to the anchorage, and when steaming in smooth water I meet a swell coming along, I know I shall get into the wind raising it a few hours after.

In the early spring and the beginning of the winter months I have had thunder and lightning with heavy rain, and squally weather in the vicinity of the islands and to the northward of them.

In November, December, January, February, and March, as soon as I clear the straits, I point the ship's head for Meyet Island on the African coast, and keep on that course until I get below the parallel of 12°, then I expect to be getting out of the current going towards the strait, and to get less wind than I had further north. If I find I am running up to the patent log I steer away east (true); this gives me a help from the eddy current going towards the east.

On nearing Ras Filuk I expect it to get much stronger; then I haul to the northward to pass Filuk close to, and immediately get into the western current again. If it is daylight I coast along close in by Ras Aluleh, and so on to Guardafui; if dark, I keep a little further off, but generally find when daylight comes in I am further off the African coast than I expected to be, and am being set up bodily to the northward between the islands as well as kept back. If the wind be at all free I make as much as I can of the fore-and-aft canvas.

After passing Sokotra I find the current setting from the N.E., there it draws more on the beam, and eventually abaft—helping me onward as I near Minikoi. But it suddenly stops short in a line with the islands, and I find on passing through I have a set to the northward, which alters to N.W., and eventually west, as I draw in with the land at Galle. The reverse happens about April, when the south-west monsoon is at hand, and all through that monsoon.

In coming home again these same months I pass south of Minikoi, and if meaning to sight it guard against the sharp set to the north which might easily put a steamer ashore, then I steer for Abd-al-Kuri and on nearing it keep away so as to pass ten or twelve miles off Guardafui, and the same distance of Ras Aluleh. Then keep west (true) on that parallel till past Aden, and then keep

TIDE TABLES FOR NOVEMBER, 1880.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge. A.M.	London Bridge. P.M.	Hull. A.M.	Hull. P.M.	North Shields. A.M.	North Shields. P.M.	Leith. A.M.	Leith. P.M.	Devonport. A.M.	Devonport. P.M.	Dover. A.M.	Dover. P.M.	Weston Super-Mare. A.M.	Weston Super-Mare. P.M.	Liverpool. A.M.	Liverpool. P.M.	Greenock. A.M.	Greenock. P.M.	Queenstown. A.M.	Queenstown. P.M.	Kingstown. A.M.	Kingstown. P.M.	Londonderry. A.M.	Londonderry. P.M.	Brest. A.M.	Brest. P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
M	1	0 23	0 44	4 53	5 13	1 53	2 12	0 47	1 7	4 4	4 26	9 32	9 54	5 12	5 35	9 47	10 7	10 29	10 51	3 23	3 44	9 40	9 59	6 28	6 49	2 12	2 32
Tu	2	1 5	1 26	5 33	5 54	2 31	2 50	1 27	1 47	4 47	5 8	10 16	10 37	5 58	6 21	10 27	10 47	11 13	11 35	4 6	4 28	10 18	10 37	7 10	7 31	2 52	3 13
W	3	1 45	2 6	6 16	6 38	3 9	3 29	2 7	2 27	5 29	5 50	11 0	11 24	6 44	7 6	11 8	11 30	11 57	—	4 50	5 12	10 57	11 18	7 51	8 10	3 34	3 55
Th	4	2 25	2 47	7 0	7 22	3 50	4 13	2 47	3 8	6 12	6 34	11 48	—	7 28	7 50	11 53	—	0 19	0 41	5 35	5 58	11 41	—	8 30	8 51	4 17	4 39
F	5	3 8	3 31	7 44	8 7	4 36	5 0	3 30	3 54	6 56	7 19	0 13	0 39	8 12	8 34	0 16	0 39	1 5	1 29	6 21	6 45	0 4	0 28	9 13	9 36	5 2	5 26
S	6	3 53	4 17	8 31	8 55	5 25	5 50	4 19	4 44	7 42	8 5	1 5	1 31	8 56	9 18	1 2	1 26	1 53	2 17	7 9	7 33	0 54	1 20	9 59	10 24	5 50	6 15
S	7	4 40	5 5	9 20	9 47	6 16	6 44	5 11	5 40	8 28	8 52	1 57	2 23	9 40	10 3	1 51	2 17	2 41	3 6	7 57	8 22	1 46	2 14	10 53	11 28	6 41	7 9
M	8	5 32	6 0	10 16	10 50	7 14	7 46	6 10	6 43	9 19	9 48	2 50	3 17	10 27	10 53	2 43	3 12	3 32	4 0	8 50	9 18	2 43	3 13	—	0 7	7 38	8 9
Tu	9	6 29	7 2	11 26	—	8 22	9 0	7 18	7 54	10 20	10 54	3 46	4 16	11 22	11 56	3 44	4 18	4 31	5 3	9 48	10 21	3 47	4 24	0 50	1 34	8 41	9 17
W	10	7 36	8 13	0 4	0 41	9 40	10 19	8 32	9 12	11 30	—	4 47	5 19	—	0 33	4 55	5 38	5 37	6 14	10 58	11 38	5 1	5 37	2 17	2 56	9 56	10 36
Th	11	8 50	9 32	1 17	1 52	10 56	11 31	9 50	10 24	0 9	0 48	5 54	6 29	1 11	1 48	6 20	6 57	6 51	7 27	—	0 14	6 12	6 45	3 30	4 0	11 14	11 49
F	12	10 6	10 40	2 25	2 56	—	0 2	10 55	11 23	1 23	1 57	7 3	7 35	2 24	2 58	7 30	8 0	8 1	8 32	0 48	1 21	7 16	7 45	4 26	4 48	—	0 20
S	13	11 12	11 41	3 25	3 52	0 29	0 54	11 48	—	2 29	2 56	8 4	8 30	3 31	4 2	8 27	8 51	9 1	9 28	1 52	2 20	8 13	8 40	5 10	5 32	0 48	1 14
S	14	—	0 7	4 17	4 40	1 17	1 39	0 11	0 33	3 21	3 46	8 54	9 17	4 30	4 57	9 13	9 34	9 52	10 15	2 44	3 8	9 5	9 28	5 53	6 14	1 37	1 59
M	15	0 29	0 51	5 1	5 21	1 59	2 19	0 54	1 15	4 9	4 31	9 40	10 2	5 21	5 44	9 54	10 14	10 37	10 59	3 31	3 53	9 49	10 7	6 35	6 56	2 20	2 40
Tu	16	1 14	1 34	5 41	6 1	2 38	2 57	1 35	1 54	4 52	5 11	10 23	10 44	6 6	6 27	10 34	10 53	11 20	11 41	4 13	4 33	10 25	10 43	7 17	7 37	3 0	3 19
W	17	1 53	2 11	6 21	6 44	3 15	3 33	2 13	2 31	5 30	5 48	11 4	11 24	6 46	7 5	11 12	11 30	—	noon	4 52	5 11	11 1	11 18	7 54	8 10	3 37	3 55
Th	18	2 29	2 46	6 58	7 16	3 50	4 8	2 48	3 5	6 5	6 22	11 43	—	7 23	7 40	11 48	—	0 19	0 37	5 29	5 47	11 36	11 54	8 26	8 42	4 13	4 30
F	19	3 3	3 20	7 34	7 51	4 26	4 44	3 22	3 38	6 38	6 53	0 2	0 21	7 57	8 13	0 6	0 24	0 55	1 13	6 5	6 22	—	0 12	8 58	9 14	4 47	5 4
S	20	3 37	3 55	8 8	8 25	5 2	5 20	3 56	4 14	7 9	7 25	0 40	0 59	8 29	8 45	0 41	0 57	1 30	1 47	6 39	6 57	0 30	0 48	9 30	9 47	5 21	5 38
S	21	4 13	4 30	8 43	9 2	5 38	5 57	4 33	4 52	7 41	7 57	1 18	1 37	9 1	9 17	1 14	1 32	2 4	2 22	7 15	7 33	1 7	1 26	10 5	10 24	5 56	6 15
M	22	4 47	5 5	9 21	9 41	6 16	6 37	5 11	5 33	8 13	8 31	1 56	2 16	9 34	9 51	1 51	2 10	2 40	2 59	7 51	8 9	1 46	2 7	10 46	11 13	6 35	6 56
Tu	23	5 24	5 45	10 2	10 25	6 59	7 23	5 56	6 20	8 52	9 14	2 36	2 57	10 8	10 27	2 30	2 51	3 19	3 40	8 29	8 51	2 29	2 51	11 42	—	7 18	7 41
W	24	6 8	6 31	10 52	11 22	7 50	8 19	6 46	7 14	9 37	10 2	3 19	3 42	10 49	11 13	3 14	3 40	4 3	4 27	9 14	9 38	3 15	3 42	0 12	0 46	8 6	8 32
Th	25	6 56	7 24	11 53	—	8 49	9 21	7 44	8 16	10 30	10 59	4 6	4 32	11 40	—	4 8	4 38	4 52	5 20	10 4	10 35	4 12	4 43	1 21	1 58	9 0	9 32
F	26	7 53	8 25	0 24	0 55	9 56	10 31	8 49	9 25	11 33	—	5 0	5 30	0 11	0 44	5 12	5 50	5 51	6 25	11 10	11 45	5 15	5 47	2 33	3 3	10 8	10 44
S	27	9 2	9 38	1 27	1 58	11 3	11 33	9 57	10 27	0 11	0 49	6 0	6 31	1 17	1 50	6 28	7 0	6 59	7 31	—	0 18	6 18	6 47	3 36	4 8	11 18	11 50
S	28	10 10	10 42	2 28	2 57	—	0 2	10 55	11 23	1 24	1 58	7 3	7 35	2 24	2 58	7 31	8 1	8 2	8 32	0 50	1 22	7 16	7 45	4 27	4 49	—	0 20
M	29	11 12	11 39	3 25	3 52	0 29	0 55	11 49	—	2 29	2 58	8 4	8 31	3 31	4 3	8 28	8 52	9 1	9 29	1 52	2 21	8 13	8 41	5 11	5 33	0 48	1 15
Tu	30	—	0 6	4 18	4 42	1 18	1 41	0 13	0 37	3 26	3 58	8 57	9 23	4 33	5 2	9 16	9 39	9 55	10 20	2 48	3 14	9 8	9 33	5 55	6 19	1 40	2 4

TIDAL CONSTANTS

FOR VARIOUS BRITISH, IRISH, AND EUROPEAN PORTS.

By applying the Tidal Constant of the place, according to its sign (+ *add*, − *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

PLACE.	CONSTANT. H. M.	PORT OF REFERENCE.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 3	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 3	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 3	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Helgoland	+0 21	Dover
Holyhead	−1 12	Liverpool
Holy Island harbour	−0 53	N. Shields
Honfleur	+5 42	Brest
Inverness	−1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+0 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 13	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 33	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 43	London
Youghall	+0 13	Queenstown

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. W. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, High Holborn, London, W.C.; 6, Lord Street, Liverpool; and 10, Erskine Street, Leicester.

ENGLISH (APPLICATIONS.)

3927. George Howard, Hull, Yorkshire. "Improvements in means or apparatus for operating or hauling in fishing nets."

3965. James Scott, Helensburgh, Dumbarton. "New or improved machinery or apparatus for raising, lowering, and disengaging ship's boats, and for loading and discharging the ship's cargo; also useful and partly applicable for other purposes on board ship."

3998. Henry Tonkinson, and William Rockcliffe, both of Sunderland, Durham. "Improvements in metal frames for supporting doors; more especially for use in iron ships."

4033. James Jack Galloway and Thomas Lindsay Galloway, both of Glasgow. "Improvements in apparatus for discharging ashes from steamboats."

4042. Frederick Alsing, Harold Sachmann, and Christian Dows, all of Copenhagen, Denmark. "Improvements in means or apparatus for recording a ship's course." (A communication.)

4048. Horatio Frederick Phillips, Rotherhithe, Surrey. "An improved mode of driving screw-propellers."

4085. Jabez Evans, Cradley Heath, Stafford. "Improvements in anchors."

4122. Samuel Henry Linn, Southampton Buildings, Chancery Lane, London. "Improvements in the construction of chambers in ships, railway carriages, and store-rooms, for preserving articles of food, and in the apparatus and method of regulating and controlling the temperature."

4130. James Findlay Guild and Arthur Edward Knight, both of Shanghai, China. "Improvements in steering apparatus for vessels."

4131. Robert McCollum Fryer, New York, U.S.A. "Im-

provements in the construction of navigable vessels, and in means for their propulsion in water or on land." (A communication.)

4239. Max Windsperger and Albert Schauller, Finsbury Square, London. "Extinguishing fire with a substantial liquid within a a few minutes which may break out in buildings, ships, &c., and preventing the same from rekindling."

CHINESE TRADE WITH CALIFORNIA.—The *Times*' correspondent, writing from San Francisco under date September 1, says:—"The arrival of the first Chinese steamer at this port has caused a great amount of interest, and mercantile circles are exercised as to the ultimate effect this innovation on the carrying trade will have on commerce and those that have hitherto been engaged in our trade with China. The *Hochung*, of 800 tons capacity, is one of the largest of the 30 steamers owned by the Chinese Company in Canton. Both the Japanese and the Chinese Governments have a treaty with the United States Government calling for reciprocity of tax on all vessels coming from the free ports; but no proclamation or order of the President has been issued to enforce this provision of the treaty. As things now stand the *Hochung* will have to pay extra Custom House duties of 10 per cent., and one dollar per ton. It will be paid under protest, and will probably be ultimately remitted when our Government have arrived at some conclusion about the terms upon which the Chinese vessels will be permitted to trade with this country. It is quite clear that if the Chinese are allowed to continue this traffic in their own ships on the terms of the most favoured nation, they will eventually secure the whole of the carrying trade in their own hands, and merchants here and in China who have hitherto been engaged in commerce with that country will have to give place to Chinese merchants. They could afford to run a line of steamers between here, Hong Kong, and Shanghai at far lower rates than those of the English or American lines now in operation. It may take some time to carry these preparations into effect, but that their intentions will be ultimately accomplished appears inevitable."

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
365	English Channel—Channel Islands—Alderney Harbour	Directions.
366	England—Thames Entrance—Smith's Knoll and Outer Gabbard	Alteration in character of buoys.
367	„ East Coast—Humber River—Newsham Booth	New leading lights.
368	„ West Coast—Liverpool Bay—N.W. and Formby Light-Vessels	Fog-horns established.
369	„ „ River Dee	Additional Buoy.
370	„ Bristol Channel—King Road	Newcome buoy altered in position.
371	Ireland—South-East Coast—Carnsore Point—Barrels Rock	New light-vessel.
372	„ East Coast—Liffey River Entrance	New light on North Bull Wall, and Poolbeg light improved.
373	„ West Coast—Killala Bay—Ross	New harbour light.
374	North Sea—Jade River	Bell buoy withdrawn, automatic signal-buoy placed.
375	Baltic Entrance—Sound—Sweden—Höganæs	New harbour lights.
376	Baltic—Gulf of Bothnia—Hudiksvall—Saltviks-udde	New leading light
377	„ „ „ Rönnskar Pitea	New leading light.
378	Norway—West Coast—Kjeungen	New light.
379	„ „ Lofoten—Vœro—Rostnœsvaagen	New light.
380	France—West Coast—St. Gilles sur Vie	New harbour lights.
381	Mediterranean—Spain—Alicante	Alteration of east mole light.
382	„ France—Marseille	New harbour lights, and buoyage.
383	„ Italy—Genoa	Extension of breakwater works.
384	„ Italy—Naples—St. Vincent, Military Port	Light on mole altered in position.
385	„ Adriatic—Dalmatia—Calamota Strait	Buoy on Cavalica shoal.
386	Black Sea—Odessa	Altered position of breakwater lights.
387	„ Kertch Strait—Yenikali Channel—Kamysh	Light discontinued, and sea marks withdrawn.
388	Red Sea—Hanish Islands—Parkin Rock	Position of rock established.
389	North Atlantic—Azores—San Miguel—Ponta Delgada	Signals for shore and vessels.
390	„ Canary Islands—Tenerife—Santa Cruz	Mole head light discontinued for repairs.
391	Africa—West Coast—Gambia River	Alteration of buoyage.
392	„ „ St. Paul de Loando—Cape Lagosta	New light and beacon.
393	India—West Coast—Dabhol (Anjanvel)—Tolkeshwar	New light.
394	„ Bay of Bengal—Madras	Harbour works, buoy withdrawn.
395	„ „ Hooghly River	Maroons from light-vessels discontinued.
396	Eastern Archipelago—Java—Sunda Strait—First Point	Lighthouse destroyed.
397	„ „ Sumatra—Sunda Strait—Flat Cape	New light.

Monthly Abstract of Nautical Notices—*continued.*

No.	Place.	Subject.
398	Eastern Archipelago — Java — Baly Strait—Banjsewanjie	New buoy.
399	„ „ Baly Island—Beliling	New harbour light.
400	China Sea—Carimata Strait—Gwalia Reef	Position established.
401	China—East Coast—Min River—Outer Min Reef	Buoy with automatic whistle established.
402	„ „ Yan-tse-Kiang — Kiu-toan	Light-vessel altered in position.
403	„ Yellow Sea—Hai-yun Island	Shoal discovered.
404	South Australia—Gulf of St. Vincent—Adelaide	Mooring buoy for ships carrying explosives.
405	Australia—Torres Strait—Normanby Sound—Heath Point	Discovery of sunken danger.
406	Pacific Coast—United States—California—Farallon	New fog-signal near light station.
407	South America — Brazil — Abrolhos Islands Light	Temporary alteration.
408	„ „ Brazil—Paranagua Bay—Conxas Point	Lighthouse altered in colour.
409	United States — South Carolina — Charleston Harbour	Directions for entering.
410	Canada—Nova Scotia—Bay of Fundy—Seal Island	Fog-signal discontinued for repairs.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

365.—English Channel.—*Channel Islands.—Alderney Harbour.—Directions.*—The following information relating to Alderney harbour, is derived from a recent report made by Commander Charles V. Anson, H.M.S. *Dasher*, on the state of the eastern or seaward end of its breakwater:—The breakwater is now broken away by the action of heavy seas for a distance of 400 feet from the extreme end. This damaged portion is nearly awash, with jagged heads and broken pieces of masonry protruding at low water. From the strength of the west-going tide, especially at springs, which sets directly on to the submerged end of the breakwater for about 9 hours out of 12, it is recommended on entering the harbour, so as to pass well clear of the dangerous portion, to keep the beacon (See Notice to Mariners, No. 83, of June 10, 1879) on King's battery well open of the beacon on Homet des Pies, until St. Anne church spire comes in line with the Old pier head, when this mark leading into the harbour should

be kept on. When the tide is running to the eastward, the shoal end of the breakwater may be safely passed by keeping on the line of the beacons erected for passing clear of this danger (the beacon on King's battery in line with the beacon on Homet des Pies). On account of the strength of the tides in the immediate neighbourhood of Alderney, a stranger should never attempt to enter the harbour at night; and before entering by day, preparation for promptly anchoring should be made.

366.—ENGLAND.—*Thames Entrance.—Alteration in Character of the Buoys at Smith's Knoll and the Outer Gabbard.*—Courtenay's Automatic sound buoys will shortly be placed in the positions now occupied by the Smith's Knoll and Outer Gabbard buoys. The form of these sea marks will then be altered, but the colours will remain as now. Further notice will be issued when the changes have been effected.

367.—ENGLAND.—*East Coast.—Humber River.—Leading Lights at Newsham Booth.*—In order to facilitate the navigation of the river, two leading lights will be exhibited at Newsham Booth, about 1½ mile below Killingholme lights, south shore of Humber river. They will be *fixed white* lights.

Note.—Vessels coming up the Humber, should keep Killingholme leading lights in line to the point where Newsham Booth lights are in line, which will then serve as leading lights, until Thorngumbald Clough leading lights come in line. Further particulars will be published.

368.—ENGLAND.—*West Coast.—Liverpool Bay.—Fog-Horns at North-West Light-Vessel and Formby Light-vessel.*—A powerful steam fog-horn will be sounded from the North-West light-vessel during thick and foggy weather, distinguishable by the nature of its sounds from the fog-horns already in use at the Bar and Crosby light-vessels. This horn will give four short blasts, each of *two seconds'* duration, within a period of *fifteen seconds*, followed by silence for *forty-five seconds*, when the short blasts, followed by the same interval of silence, will be again repeated. In the event of a fog coming on so suddenly as to prevent the steam fog-horn from being brought immediately into use, or in case of the fog-horn being disabled, the fog-bell will be sounded as hitherto, until the

horn is in readiness. Also, on 1st November, 1880, a fog-horn similar to that of the North-West light-vessel above described, will be established at the Formby light-vessel. *Variation*, 18° *W.*

369.—ENGLAND.—*West Coast.*—*Entrance to the River Dee.*—*Additional Buoy.*—A spit of sand having recently grown out between the S.W. and South Hoyle buoys, an 8 feet *conical* buoy painted in *black and white vertical stripes*, and named Hoyle Spit, has been placed to mark the same. The buoy lies in 2½ fathoms at low water spring tides, with the following marks and bearings, viz.:—A large red brick house near the beach, in line with Talacgoch Lead Mine Works, S.S.W. ½ W.; Talacre Mansion, in line with a clump of trees on the summit of the hill on the back land, S. by E. ¾ E.; South Hoyle buoy, S.E. by E. ¾ E., distant $\frac{8}{10}$ths of a mile; S. W. Hoyle buoy, N. by W. ¼ W. Wly.. distant $\frac{9}{10}$ths of a mile; Middle Patch buoy, N.W. ½ W., distant $2\frac{2}{10}$ths miles; Earwig buoy, S. by W., distant $\frac{9}{10}$ths of a mile.

370.—ENGLAND.—*Bristol Channel.*—*King Road.*—*Newcome Buoy.*—The Newcome buoy has been moved south about one cable from its former position, and now lies in 3¼ fathoms at low water spring tides, with the following marks and bearings, viz.:—Flagstaff on Possitt hill, in line with the west end of the second house west of the hotel, S. by W. ¼ W.; high water mark at Blacknore point, W.S.W.; Firefly buoy, S. by E. ¼ E.; Cockburn buoy, E. ¾ S.

371.—IRELAND.—*South-East Coast.*—*Carnsore Point.*—*Light-Vessel off Barrels Rock.*—With reference to previous Notice a light-vessel has been placed 2 miles south of Barrels rock, situated to the south-west of Carnsore point:—The light is *red*, showing *two flashes* in quick succession *every thirty seconds;* the flashes occupy about *eight seconds*, followed by about *twenty-two seconds* of darkness. The light-vessel is painted black with narrow white streak, and the words *Barrels rock* in large white letters on her sides—a black barrel (vertically placed) is carried at the main mast-head.

Caution.—Mariners are warned that passing inside this light-vessel will be attended with danger. *Variation*, 21¾° *W.*

372.—IRELAND.—*East Coast.*—*River Liffey Entrance.*—*Light on North Bull Wall.*—With reference to Notice 221, p. 607, this light

is now exhibited on the extremity of North Bull wall, about 330 yards northward of Poolbeg lighthouse. It is an *occulting white* light; that is, showing *bright* for *ten seconds*, and eclipsed for *four seconds;* elevated 50 feet above high water. Poolbeg light (fixed white) is also intensified to seaward.

373.—IRELAND.—*West Coast.—Killala Bay.—Harbour Light at Ross.*—To enable vessels to clear St. Patrick rocks, a harbour light is now exhibited from a window in the tower of the coastguard station at Ross, Killala bay. It is a *fixed red* light, visible between the bearings of W. by S. ½ S. (through west) and W. by N. ⅜ N. The northern limit of the sector leads about two cables south-eastward of St. Patrick rocks; the southern limit leads a little outside of Killala bar buoy. Position, lat. 54° 13′ 55″ N., long. 9° 11′ 45″ W. *Variation*, 24½° *W.*

374.—NORTH SEA.—*Jade River.—Bell Buoy off Entrance Withdrawn, and Automatic Signal Buoy Placed.*—This buoy, painted red with broad black band, and the word *Jade* in white letters on two sides, is moored in 7 fathoms water, in line between Weser light-vessel and Wangeroog lighthouse, with the lighthouse distant $3\frac{6}{10}$ths miles, and Wangeroog church bearing S. by W. ¾ W.

Note.—Vessels may pass on either side of this buoy. *Variation*, 14½° *W.*

375.—BALTIC ENTRANCE.—*The Sound.—Sweden.—Harbour Lights at Hoganæs.*—Two harbour lights at Hoganæs (Höganäs), east side of northern entrance to The Sound:—1. A fixed *green* light from the harbour mole head; elevated 19 feet above the sea, and visible from a distance of from 2 to 3 miles. 2. A fixed *white* light 942 yards E. by S. ½ S. from the green light; elevated 48 feet above the sea, and visible from a distance of from 3 to 4 miles.

Note.—These lights will be exhibited throughout the year, except when the harbour is closed by ice. Approaching Hoganæs harbour, these lights should be kept in line, or the inner white light open a little southward of the outer green light—on nearing the harbour entrance, the green light should be kept on the port hand. Position approximate of outer light, lat. 56° 12′ 0″ N., long. 12° 33′ 20″ E. *Variation*, 11½° *W.*

376.—BALTIC. — *Gulf of Bothnia.* — *Sweden.*—*Hudiksvall.*—*Leading Light on Saltviks Udde.*—On the western side of entrance to Hudiksvall fiärd, and exhibited from the gable end of the lighthouse building:—The light, elevated 24 feet above the sea, and visible from a distance of 10 miles, shows *red flashing* with *one flash* between the bearings of N. 20° W. and N. 26¼° W.; *fixed white* between N. 26¾° W. and N. 28¾° W.; and *white flashing* with *two flashes* between N. 28¾° W. and N. 32½° W. Position approximate, lat. 61° 40′ 30″ N., long. 17° 16′ 30″ E. *Variation*, 8½° *W*.

Note.—The fixed white light leads between the sea marks clear of all shoals. Exhibited annually from 1st August to 15th December.

377.—BALTIC.—*Gulf of Bothnia.*—*Leading Light on Rönnskär Pitea.*—Shown from the pilot's house on Rönnskär, southern approach to Pitea:—The light is a *fixed red*, visible between the bearings of S. 59° W. (through west) and N. 48° W.; and between N. 45° W. (through north) and N. 76° E.; elevated 23 feet above the sea, and seen from a distance of 5 miles. Position approximate, lat. 65° 3′ 30″ N., long. 21° 33′ 30″ E. *Variation*, 5¾° *W*.

Note. — The light is obscured through the sector between N. 45° W. and N. 48° W., by a small church situated in front of it. Mariners approaching from the southward are cautioned that Nygrunden shoal lies within this sector. Vessels wanting a pilot should keep within the limits of the light. Exhibited annually from 1st August to 15th November.

378.—NORWAY.—*West Coast.*—*Light on Kjeungen.*—Exhibited from a lighthouse erected on Kjeungen (Kjeungeme or Kjeurns rock), covered at high water—approach to Biugn (Bjugn) fiord. It is a *fixed* light, elevated 46 feet above the sea, and visible from a distance of 11 miles; it will show as follows:—

1. *White* in the channel across Granvigen between N. 41° E. (this bearing leads clear of the shoals and rocks of Kjeldsgrunden, Espelandstarren, and Lysbottenfluen) and N. 36° E. (this bearing leads westward of Rödsiden, Ribefluen, and Rugmelsfluen). 2. *Red* between N. 36° E. and N. 30° E. (this bearing leads one cable's length westward of Smerlingfluen). 3. *White* between N. 13° E.

and S. 86° W. (this bearing leads southward of Biugnholm [Bjugnholm] and adjacent shoal ground). 4. *Red* between S. 86° W. and S. 30° W. (this bearing leads half a cable westward of Biugnskjœret). 5. *White* between S. 30° W. and S. 77° E. (this bearing leads half a cable northward of Taarnholmen). The lighthouse, 57 feet high, is octagonal in shape and painted red. Position approximate, lat. 63° 43′ 40″ N., long. 9° 35′ 15″ E. *Variation*, 16° *W*.

Note.—Vessels approaching from the southward, and having passed Tyveholmen should keep on the port side until entering the white light, which should then be steered for, with a red light on the starboard hand, and the light obscured on the port hand—it must be borne in mind that within this arc of white light there is a shoal with 21 feet over it, situated 2 miles S. 38° W. from the lighthouse. Having passed the lighthouse, which may be rounded close to the eastward, sheer a little to port until within the white light, and then keep on its eastern edge, so avoiding Fentarren and Midtfjordsskjœr on the port side, and Vettaboen on the starboard side. Having passed Vettaboen, sheer into the red light, after which no further guidance is derived from the light. Vessels entering Biugnfiord should keep on the northern edge of the white light, by which they will clear the shoals on the south side of the fiord, and pass close northward of Yenœsset. Exhibited annually from 1st August to 15th May.

379.—NORWAY.—*West Coast.—Lofoten Islands.—Vœro.—Light on Röstnœsvaagen.*—Exhibited from the corner of a building erected on a point projecting from the eastern side of Röstnœsvaagen. It is a *fixed white* light elevated 31 feet above the sea, and should be seen from a distance of eight miles; it will be visible seaward between S. 47¼° W. (this bearing leads eastward of Kvistholms ledges) and N. 81° E., where it will be obscured by Maahorn (Mahornet), the south-western point of Vœro. The lighthouse, 36 feet high, is constructed of white concrete. Position as given, lat. 67° 39′ 0″ N., long. 12° 45′ 15″ E. *Variation*, 13½° *W*.

Note.—Vessels approaching from the southward will pass eastward of the shoals southward of Vœro by bringing the light westward of N. 13½° E. Entering Röstnœsvaagen between the

lighthouse point and the rock Seiklak (marked by a beacon), keep nearer the rock in order to avoid a shoal projecting from the lighthouse point. Bound into Sörlandsvaag (the best harbour for large vessels) keep westward of Seiklak rock. Exhibited annually from 1st September to 14th April.

380.—FRANCE.—*West Coast.—St. Gilles Sur Vie.—Harbour Lights.*—The direction for entering the harbour of St. Gilles sur Vie is indicated by the following lights :—1. The *outer* light is *fixed red*, elevated 17 feet above the ground, 22 feet above high water, and visible from a distance of 9 miles. The lighthouse consists of a square tower constructed of masonry, and is situated near Croix de Vie quay. Position as given, lat. 46° 41′ 55″ N., long. 1° 56′ 50″ W. 2. The *inner* light is *fixed red*, elevated 60 feet above the ground, 75 feet above high water, and visible from a distance of 9 miles; it bears N. 57¾° E. from the outer light, distant 284 yards. The lighthouse consists of a square tower constructed of masonry, and is situated at the edge of the enclosed road of Croix de Vie. The fixed red light formerly exhibited at the Grand mole head, is replaced by a fixed *white* light. *Variation*, 18½° *W.*

381.—MEDITERRANEAN.—*Spain.—Alicante.—Alteration in East Mole Light.*—A new *red* light is exhibited, visible from a distance of five miles.

382.—MEDITERRANEAN.—*France.—Marseille.—Harbour Lights and Buoyage.*—On 1st September, 1880, two fixed *red* lights, placed vertically three feet apart, were exhibited from the north-west corner of the mole of the national basin at Marseille, immediately southward of the Traverses de la Pinède. These lights are shown from a frame-work of wood, situated on the quay wall, 16 feet within the edge; the upper light is elevated 19 feet above the sea. The two buoys (black) that previously marked the extremities of this mole during construction, have been withdrawn. Also, that two buoys are now moored a short distance beyond the north-west and south-west corners of the mole situated between the Traverse de l'Abattoir and the mole d'Arènc. Two *red* lights, placed vertically, are shown from the northern buoy.

383. — MEDITERRANEAN. — *Italy. — Extension of Breakwater*

Works at Genoa.—With reference to Notice 307, p. 782, the following additional information relating thereto has been published. On 30th August, 1880, an additional buoy will be placed at 55 yards S. 81° E. from the buoy marking the outer extremity of the second arm of the New or Western mole. This buoy, painted black below and white above water, is a square trunk bell buoy, with a staff, which at the height of 12 feet above the sea, carries a bell in a cage painted red and white in vertical stripes, surmounted by a ball 3½ feet in diameter, also painted red and white. Above the ball a prismatic reflector and a red and white flag is placed, at a height of 27 feet above the sea. From the buoy, the lighthouse on extremity of New or West mole bears N. 22° W. distant 1,312 yards, and the outer extremity of Cava battery N. 53° E., distant 858 yards. The first arm of the new breakwater, extending south (*true*) from the New or West mole, is now completed to a mean height of 6½ feet above sea level for a distance of 273 yards, and over the remaining portion there is a depth of about 20 feet. The position of this arm is marked by cylindrical iron mooring buoys, 6½ feet long and 4 feet in diameter. The second arm extends in a direction of S. 52° E. from the southern extremity of the first arm, and will be prolonged for a distance of 906 yards; the masonry has been commenced for a distance of about 219 yards, over which there is a depth of about 19½ feet. The position of the works in this second arm is marked by mooring buoys and by a double row of vertical stakes about 3¼ feet high. As the breakwater advances, additional stakes and buoys will be laid down, to mark the limits within which the work is being carried on.

Note.—Vessels approaching the port of Genoa from the westward, should pass southward of the bell buoy, and at night should not haul to the northward in order to enter the port, until the long line formed by the western lights of Via Rivoli (adjoining the Piazza de la Cava) open out bearing N.E. *Variation*, 13° *W.*

384.—MEDITERRANEAN.—*Italy.*—*West Coast.*—*Naples.*—*St. Vincent Mole Light.*—*Alteration in Position.*—Moved 62 yards seaward—to the extremity of the recently completed works.

385. — MEDITERRANEAN. — *Adriatic.* — *Dalmatia.* — *Calamota Strait.*—*Buoy on Cavalica Shoal.*—Placed on the north-west edge

of Cavalica (Chiavelica) shoal, between Calamota and Mezzo islands. The buoy *(can)*, surmounted by a frame ball and painted white, is moored in 26 feet at low water, with the following bearings, viz.:—Rataz point, Calamota island, N. 73° 40′ E.; Cavalica point, Calamota island, S. 61° 20′ E.; St. Andrea island lighthouse (Donzella), S. 48° 25′ W.; Polughe point, Mezzo island, N. 64° 10′ W. *Variation*, 9° *W*.

386.—BLACK SEA.—*Odessa.—Alteration in Position of Breakwater Lights.*—On August 12, 1880, the two fixed white lights exhibited from posts westward of the breakwater in course of construction, were moved 640 yards westward.

Note.—Passing between these lights and the breakwater is very dangerous.

387.—BLACK SEA.—*Kertch Strait.—Yenikali Channel.—Temporary Discontinuance of Kamysh Light, and Withdrawal of Sea Marks.*—On September 13, 1880, Yenikali channel, Kertch strait, would be closed to navigation for dredging operations, in the direction of the leading lights of Kamysh (Kamish) and Churubash lights in line; on this account, Kamysh light is temporarily discontinued, and the sea marks of the channel are withdrawn.

Note.—The limits of the works in progress will be marked during the day by ordinary sea marks, and at night by lanterns. Vessels drawing not more than 14 feet may use the old channel, which, entering the sea of Azov, is marked by three black buoys on the starboard hand, and by two red buoys on the port hand.

388.—RED SEA.—*Hánish Islands.—Position of Parkin Rock.*—Commander J. E. Pringle, H.M.S. *Vulture*, gives the following information relative to the position of Parkin rock, lying about 3¼ miles eastward of Rugged island, one of the Suyúl Hánish group. The rock, which appeared to be about 8 feet above water (in August), lies with the following bearings, viz.:—South-east point of Quoin islet, N. 3° 40′ E.; South point of Rugged island, S. 83° 40′ W., distant 4¼ miles. These bearings place Parkin rock S.S.W. one mile from the position formerly assigned to it. *Variation*, 4½° *W*.

389.—NORTH ATLANTIC.—*Azores.—San Miguel.—Ponta Delgada.—Signals.*—The following signals for communication between

vessels and the shore are in use at Ponta Delgada, Santa Miguel (St. Michaels) :—

From vessels to the shore—

1. Want a pilot—National flag at the fore with pendant under.
2. Am damaged—Pendant at the fore with national flag under.
3. Have no anchors—National flag at the main with pendant under.
4. Am very leaky—Pendant at the main with national flag under.

From the shore to vessels—

5. Look out for a good place to receive a pilot—Red flag with streamer under. 6. Pilot cannot be sent on board—Streamer with red flag under. 7. Put to sea with the least delay—National flag with red flag under. 8. Can come into the harbour—Red flag. 9. General prohibition to enter the artificial harbour—Black ball with red flag under.

Note.—The Internation Code of signals is used to communicate with vessels ignorant of the Port regulations.

390.—North Atlantic.—*Canary Islands.—Tenerife.—Santa Cruz.—Temporary Discontinuance of Mole Head Light.*—When repaired, the light will be re-exhibited.

391.—Africa.—*West Coast.—Buoyage of Gambia River.*—Alterations in the buoyage of the entrance to Gambia river :—Middle buoy now lies in 4¾ fathoms water; from it cape St. Mary (the red cliff) bears S. 7° W. distant 5½ miles, and African knoll western buoy S. 62° E. African knoll is now marked by two buoys, both placed on the southern side of the knoll. The western buoy, a black trunk buoy, is moored southward of the depth of two fathoms; from it cape St. Mary bears S. 64° W.; flagstaff at Bathurst S. 4° W. and the eastern African knoll buoy S.E. by E. ¾ E., distant one mile. The eastern buoy, a black can buoy with staff and cage, lies in 7 fathoms water, with Cape St. Mary bearing S. 71° W., and flagstaff at Bathurst S. 13° W.

Caution.—Vessels entering Gambia river should pass southward of the two buoys marking African knoll, instead of proceeding, as formerly, northward of that danger.

392.—Africa.—*West Coast.—St. Paul de Loando Harbour.—Light on Cape Lagosta.*—At some time during August or September, 1880, a light would be exhibited from a lighthouse erected on

cape Lagosta. It is a *fixed white* light, varied by a flash every *two minutes*, and visible from a distance of 15 miles. The light tower is 32 feet high. Position approximate, lat. 8° 46′ S., long. 13° 17′ E. Further notice will be given.

2. *Beacon on South Side of St. Paul de Loando Harbour.*—A beacon in the form of a triangular pyramid, 19 feet high, constructed of masonry and painted black and white in horizontal stripes, has been erected north-eastward of the farm of Boa Vista, St. Paul de Loando harbour.

Note.—The centre of fort St. Pedro, in line with this beacon, leads half-a-mile east of the light-vessel moored off the north-east part of Loando reef. *Variation*, 20° *W.*

393.—India.—*West Coast.*—*Dabhol (Anjanvel).*—*Light at Tolkeshwar.*—Exhibited on Tolkeshwar head, south side of entrance to Dabhol (Anjanvel or Wáshishti) river. It is a *fixed white* light, elevated 333 feet above high water, visible through an arc of 178°, or between the bearings of N. by W. ½ W. (nearly) and S. by E. ½ E.; it should be seen from a distance of about 15 miles. The light will be exhibited from an iron column, 24 feet high and painted white; it is enclosed at its base by a circular iron house, also painted white, and is situated about 100 yards W. by S. from Tolkeshwar temple. Position, lat. 17° 33′ 50″ N., long. 73° 7′ 45″ E.

Note.—Light exhibited from 1st October to 1st June.

394.—India.—*Bay of Bengal.*—*Madras Road.*—*Extension of Harbour Works, Middle Buoy Withdrawn.*—With reference to Notice 202, p. 522, on 25th August, 1880, in consequence of the extension of the Harbour piers into deep water, and in order to afford greater space for steam vessels within the Harbour piers, the large red buoy, which previously marked the western limit of anchorage for steam vessels, would be withdrawn. Commanders of steam vessels are therefore cautioned not to anchor in less than 5½ fathoms, at low water. In anchoring in this depth, however, they will do so on their own responsibility, and with the exercise of extreme care. All sailing vessels, except coasting craft, should anchor in or beyond the depth of 8½ fathoms, outside the line of the Northern and Southern Port buoys. The Port buoys are painted

half red, half white vertical, and are moored in 8 fathoms water. These buoys are danger buoys, and mariners are cautioned not to pass inshore of them, nor to come under 9 fathoms at night. The Northern buoy marks the position which will form the extremity of the North pier of the harbour. Vessels are on no account to attempt to pass between the Northern and Southern buoys and their respective piers, as the rubble bases of both extend much farther seaward than the piers themselves.

395.—INDIA.—*Bay of Bengal.—Hooghly River.—Discontinuance of Maroons from Light-vessels.*—After 1st December, 1880, burning maroons from the light-vessels stationed in Hooghly river will be discontinued—and these signals will then be burnt only from the Pilot brigs. Also, during the time the "Intermediate" light-vessel is not at her station (from 1st December to 31st January)—Lower Gaspar light-vessel will, from sunset to sunrise, burn a blue light at the hour, in addition to the one now burnt at the half-hour. These alterations will not affect the order in which blue lights or rockets are exhibited from other light-vessels.

396.—EASTERN ARCHIPELAGO.—*Java.—Sunda Strait.—Destruction of First Point Lighthouse.*—The stone lighthouse on First point (Tanjong Koelong), the south point of entrance to Sunda strait, has been thrown down by a violent earthquake.

397.—EASTERN ARCHIPELAGO.—*Sumatra.—Sunda Strait.—Light on Flat Cape.*—With reference to previous notice on the intended establishment of a light on Flat cape (Vlakken hook or Pamantyoss point), north-west entrance point of Sunda strait, the light is now exhibited. It is a *flashing* light, elevated 205 feet above high water, visible seaward between the bearings of S. 42° E., and N. 58° W., except where it is obscured by Little Fortune (Klein Fortuin or Batoe Ketyil) islet, between S. 72° E. and S. 76° E.; it should be seen from a distance of 21 miles. Position approximate, lat. 5° 58′ 50″ S., long. 104° 30′ 40″ E. *Variation, ½° E.*

398.—EASTERN ARCHIPELAGO.—*Java—Bally Strait—Buoy off Banjoewangie.*—To mark the position of the telegraph cable which is laid between Banjoewangie and port Daridin. The buoy, from which the cable extends in a N. 84° W. direction to the shore, is

conical, painted red with staff and ball, and the word *cable* painted on it four times; it is moored with the following bearings, viz.:—Kenhare tree, N. 13° W.; Flagstaff on Banjoewangie beach, N. 78° W.; Pakem head, S. 30° W.

Caution.—Mariners should avoid anchoring in the vicinity of this submarine cable. *Variation, ¼° E.*

399.—EASTERN ARCHIPELAGO.—*Baly Island.*—*Harbour Light at Beliling.*—Exhibited at Beliling (Papejan Beliling), near Sangsit, north coast of Baly Island. It is a *fixed white* light, visible from a distance of 8 miles. Position, lat. 8° 6′ S., long. 115° 3′ E.

400.—CHINA SEA.—*Carimata Strait.*—*Position of Gwalia Reef.*—Respecting the existence of a shoal reported in lat. 1° 12½′ S., long. 108° 43½′ E., on which the British ship *Gwalia* was totally wrecked on 15th February, 1880, Commander W. H. J. Nowell, H.M.S. *Foxhound*, from an examination of the locality, reports that the danger (*Gwalia Reef*) is of coral formation, nearly circular in shape, and about half-a-mile in diameter; the general depths over it are from 3 to 4 fathoms, but there are two patches, breaking at low water, on which the least depth found was 4 feet; the reef lies with the following bearings, viz., Carimata peak, S. 34° E.; Panambungan north peak, S. 81° E. Position as given, lat. 1° 3′ S., long. 108° 33′ E. During the *Foxhound's* stay, the current set W.S.W. from 1 to 2 knots per hour; the rise of tide was observed to be about 7 feet, one high and one low water occurring in the 24 hours. *Variation, 1¼° E.*

401.—CHINA.—*East Coast.*—*Min River Entrance.*—*Buoy with Automatic Whistle off Outer Min Reef.*—Placed about one cable north-eastward of the northern extreme of Outer Min Reef. The buoy, painted red and black chequered, 10 feet in diameter at the water-line, with the word *Min* on it in white letters, is moored in 11 fathoms water, with the following bearings, viz.:—Chang Chi peak, N. 49° E.; Sharp peak, N. 73° W. *Variation, 1° W.*

402.—CHINA.—*East Coast.*—*Yang-Tse-Kiang.*—*Kiu-Toan Light-Vessel.*—*Alteration in Position.*—The light-vessel is now moored in 8 fathoms water on the north side of the channel, with the following bearing and distance, viz.:—Kiu Toan beacon, S. 67° W., distant about 2½ miles.

Note.—In order to avoid the south-eastern part of Block House shoal, vessels should not bring *Kiu-Toan* light-vessel westward of the bearing N. 37½° W., when within the distance of 4 miles seaward of her. *Variation*, 2° *W.*

403.—CHINA.—*Yellow Sea.*—*Sunken Danger Westward of Hai-Yun Island.*—Lying about 1¼ miles westward of Hai-Yun (Hai-yang-tao) island, approach to Thornton haven. This danger (Chen-t'ien-chiao or curved sunken rock), on which H.I.C.M.S. *Chen-tung* grounded on 13th May, 1880, is about 30 yards square, with 5 feet on its shoalest pinnacle, 7 to 8 fathoms close, and 21 fathoms around; it lies with the following bearings, viz.:—Zöe head, N. 31½° E.; South extreme Hai-yun island, S. 67½° E. *Variation*, 3½° *W.*

404.—SOUTH AUSTRALIA.—*Gulf of St. Vincent.*—*Port Adelaide.*—A screw mooring for the use of ships having explosives on board has been placed in mid-stream, in 20 feet at low water. Its position is nearly N.W. from the entrance to the north arm. Pilots and masters of vessels are requested to be careful when passing the buoy during the night.

405.—AUSTRALIA.—*Torres Strait.*—*Normanby Sound.*—*Sunken danger off Heath Point.*—Reported as lying in the fairway of the channel between Prince of Wales and Thursday islands, Normanby sound. This danger (*Pinnacle rock*) is stated to be 150 feet long and 50 feet broad, with not more than 13 feet at low water on its shoalest part, which appeared to be a pinnacle rock, with foul ground around, and a strong tide rip over it; it lies with the following bearings, viz.:—Heath point rock, S.S.E. ¼ E.; Webb point, W. ¾ N. *Variation*, 4¾° E.

406.—PACIFIC COAST.—*United States.*—*California.*—*Fog-Signal at Farallon Light Station.*—A first-class steam-siren, giving blasts of 5 seconds' duration, at intervals of 45 seconds, will be sounded during thick and foggy weather from a station about 600 feet S. 31° E. from the light-keepers' dwellings, on the south-east Farallon island, Coast of California.

407.—SOUTH AMERICA.—*Brazil.*—*Abrolhos Islands Light.*—*Temporary Alteration in Character.*—Until the repairs of the illuminating apparatus of Santa Barbara light, Abrolhos, are

completed, the light will show a *fixed* light, without intervals of eclipse.

408.—South America.— *Brazil.*— *Paranagua Bay.*— *Conxas Point Lighthouse.*—*Alteration in Colour.*—The colour is *white* instead of red as previously.

409.—United States.—*South Carolina.*—*Directions for entering Charleston Harbour.*—The south jetty, under construction at Charleston bar for the improvement of the harbour, is now extended so far as to reach across the line of the range or leading lights on Sullivan's island. In order to guide vessels into the harbour, a first-class nun-buoy (black, No. 1½) has been moored half-a-mile south of the jetty and a little west of the line of the Sullivan's island range, Fort Sumter beacon-light bearing N.W. by N. ¼ N. In order to enter the harbour, proceed as directed in the buoy-list of the sixth lighthouse district (under the head of Main channel) until up with this buoy, then change course to N.E. by N., and run on until Sumter beacon bears N.W. by N. ¼ N., then steer N.N.W. until back again on the Sullivan's island range line, when proceed as directed in the buoy-list. By following the above directions, a vessel will cross the jetty with at least 20 feet at low water until another tier of mattresses is laid down, when further directions will be issued.

410.—Canada.—*Nova Scotia.*—*Bay of Fundy.*—*Seal Island Fog-Signal.*—*Temporary Discontinuance.*—The steam fog-whistle is discontinued for repairs until further notice.

OUR OFFICIAL LOG.

Official Inquiries at Home, 1880.

726. *Kilvey*, brig; built at Prince Edward Island, 1867; owned by Mr. E. Timothy and others; tonnage, 237; Troon to Demerara; coals; abandoned at sea, August 6, 1880. Inquiry held at Liverpool, September 15, 1880, before Raffles, Stip. Mag.; Wilson and French, N.A. Master not guilty of wrongful act or default, but did not sufficiently exert his authority in urging the crew to continue pumping.

727. *Horseguards*, s.s.; built at Whiteinch, 1872; owned by Mr. William Laing and others; tonnage, 909; loading coals in Penarth Dock; suffered severe damage from an explosion. Inquiry held at Cardiff, September 11, 1880, before Jones, Judge; Ward and French, N.A. Accident caused by an explosion of gas coal. No blame attached to master.

729. *Silurian*, s.s.; built at Wallsend, Newcastle-on-Tyne, 1876; owned by Mr. Stallybrass and others; tonnage, 792; Cardiff to Salonica; patent fuel; wrecked on Chapman Rock, near Hartland Point, September 2, 1880. Inquiry held at Cardiff, September 18th, 1880, before Jones, Judge; Clarke and Comyn, N.A. Disaster caused by want of careful navigation on the part of the master. Certificate suspended for three months.

730. *Orient*, ship; built at Quebec, 1873; owned by Mr. J. Hatfield and others; tonnage, 1,025; Cardiff to Portland, Oregon; steel rails; abandoned at sea, June 8, 1880. Inquiry held at Glasgow, September 23, 1880, before McLean and Walker, J.P.; Cowie and Murdoch, N.A. Vessel navigated with proper and seamanlike care. Abandonment justifiable.

731. *Joseph Ferens*, s.s. The case of this vessel, which was supposed to have foundered at sea, was *re-heard* at Newcastle, September 20, 1880, before Rothery, Wreck Commissioner; Ravenhill, E.A.; Forster and Castle, N.A.; additional evidence was adduced, and it was decided that the vessel, when leaving port, was not overladen.

732. *Broomhaugh*, s.s.; built at North Shields, 1872; owned

by Mr. John Elliott and others; tonnage, 865; Taganrog to London; wool and grain; lost near Ushant, September 1, 1880. Inquiry held at Newcastle, September 21, 1880, before Rothery, Wreck Commissioner; Forster and Castle, N.A. Loss due to master neglecting to ascertain the vessel's true position. Certificate suspended for six months; recommended for one as mate during that time. Second officer warned to be more careful.

734. *Fairhead*, s.s.; built at Belfast, 1879; owned by the Ulster Steamship Company; tonnage, 733; Barrow to Cronstadt; pig iron; damaged by striking the rocks in Kyle Rhea Sound, Isle of Skye, August 20, 1880. Inquiry held at Belfast, September 30, 1880, before O'Plunkett, Judge; Cowie and Murdoch, N.A. Master in default in not having his anchors over the bows, ready to let go. Severely reprimanded.

Flos, s.s.; built at Stockton, 1870; owned by H. Briggs and Co.; tonnage, 1,097; lying in Great Grimsby Dock, laden with coal, and bound for Alexandria; detained by order of the Surveyor to Board of Trade, who considered the vessel too deep. Order appealed against and appeal heard at Hull, September 18, 1880, by Rothery, Wreck Commissioner; Parfitt and Samuelson, N.A. Vessel ordered to be released on being lightened to the extent of six inches.

739. *Capri*, barque; built at Maitland, Nova Scotia, 1875; owned by Mr. J. Northop and others, of Halifax; tonnage, 895; Drobah, Norway, to New York; ice; lost on the island of Unst, Shetland, September 11, 1880. Inquiry held at Leith, October 7, 1880, before Pentland and Wilkie, Judges; Cowie and Ward, N.A. Accident caused by improper and unseamanlike navigation. Master's certificate suspended for three months, and recommended for one as mate during that period.

Official Inquiries Abroad.

722. *Nola;* lost in Copirapo Bay, coast of Chili, June 26, 1880. Naval Court held at Valparaiso, July 22, 1880. Master in default for making no allowance for currents. Certificate suspended for six months.

723. *Dundee;* burnt at sea. Naval Court held at Rio de Janeiro, July 28, 1880. Casualty due to spontaneous combustion. Master free from blame.

724. *West Stanley.* Inquiry held to decide as to the vessel's seaworthiness, June 28, 1880. Court held that she was too deeply laden, and was therefore unseaworthy in this respect.

725. *Consett*, s.s.; lost on the Maldive Islands, May 7, 1880. Inquiry held at Galle. Accident due to set of the current. Master exonerated.

728. *Miramar;* stranded on an unknown rock off Abd Alkuri, Gulf of Aden, June 6, 1880. Inquiry held at Singapore, July 19, 1880. Master exonerated from blame. Court suggested that warnings to mariners should be issued respecting this rock, two vessels having touched it.

733. *Drumclog*, barque; lost whilst proceeding to sea from Bassein, June 30, 1880. Inquiry held at Bassein, July 19, 1880. Master in default. Certificate suspended for six months, and recommended for one as mate during that period.

737. *Island Belle*, brigantine; stranded at Port of Spain, Trinidad. Inquiry held there, August 3, 1880. Master exonerated.

738. *Winchester*, ship; lost in the Macassar Straits, July 14, 1880. Naval Court held at Sourabaya, July 28, 1880. No blame attached to master or officers.

740. *China*, schooner; lost on Castle Island Reef, Bahamas, August 19, 1880. Inquiry held at Nassau, September 2, 1880. Master to blame for skirting the land too closely, and for not making allowance for currents.

GENERAL.

Colour Blindness.—In the last session of the United States Congress at Washington, May 24th, 1880, the "Committee on Naval Affairs" reported a bill in support of a proposed International Commission to agree upon standard tests for colour blindness and visual power in naval and merchant seamen, and standard requirements of these faculties. Resolutions in recommendation of this Commission have been passed by the American Ophthalmological Society, at their Newport meeting, the Ophthalmological Section of the British Medical Association at Cambridge, and the International Congress of Ophthalmology at Milan. The next United States Congress will act on this bill to initiate the Commission. Dr. R. Joy Jeffries, 15, Chesnut Street (Beacon Hill), Boston, Mass., U.S., America, intimates that he will be greatly indebted for any public or private statistics or information in relation to this subject, which anyone can send him.—*Nature*, October 14.

Indian Tide Tables.—The Indian Government have taken energetic steps to institute tidal observations at some of their principal ports, and the results will be published in the form of tide-tables. The observations are reduced by Mr. E. Roberts, of the *Nautical Almanac* Office, by the system of harmonic analysis, which has been adopted for the reductions carried out under the auspices of the British Association. The number of ports for which tables for 1881 will be forthcoming is seven, viz., Aden, Kurrachee, Bombay, Carwar, Beypore, Paumben, and Vizagapatam. We understand that some preliminary tables have been already checked on the spot in India, and have been found to be remarkably accurate. The number of ports will be increased to about twelve in 1882, and eventually to twenty-two, the full number for which it is contemplated to issue tide-tables. It is very gratifying to find the Indian Government taking such useful measures on behalf of shipping interests and navigators in general, and we hope it may serve as a stimulus to our own Admiralty, which might, perhaps with advantage, display more enterprise in its hydrographical labours.—*Athenæum*.

THE

NAUTICAL MAGAZINE

FORTY-NINTH YEAR.

VOLUME XLIX.—No. XII.

DECEMBER, 1880.

BRITISH TRADE IN THE PACIFIC.

DO we realise the full extent of our interests in the Pacific? It often looks as though, in our frequent self-congratulation on the magnitude of our ocean commerce, we either forget, or fail to comprehend how great a portion of it is carried on with the countries—some independent States, some still colonies—which bound the waters of the greatest of all the oceans. We seldom indeed seem to be perfectly alive to the enormous growth of our transmarine dominions in the south-western corner of the Pacific. Men not yet past their prime had already entered on their careers before the Australasian colonies had attained to anything like that pitch of development, economical, industrial, and political, which seems to indicate a shifting of the centre of gravity of our trade, nearer at least, to the opposite hemisphere. Thirty years ago the whole number of the English-descended inhabitants of our Colonial Empire in all parts of the world amounted to less than the population of Australasia now. A glance at the more important statistics of our Antipodean possessions will show us how rapid has been the progress they have made.

At the end of 1877 the population of all these colonies amounted to 2,503,217. The public revenues were £17,629,028; and the

united public debts £61,583,394. The population of the kingdom of Denmark is about 2,000,000, and the revenue £2,582,596. The population of Sweden is 4,531,863; the total revenue being £4,035,000. Belgium has a population of 5,336,185, a revenue of £10,413,354, and a debt almost exactly equal to the united indebtedness of the Australasian colonies, whose revenues exceed hers by about 70 per cent. The Belgian debt is £61,653,898. All these three kingdoms are justly considered thriving States. Considerable as our Australasian dependencies appear, judging from the above figures, it is when we come to look at our commercial relations with them that we at once begin to realise how largely our interests are bound up with their well-being. In the list of countries from which we take our imports, Australasia stands below only the United States and France; and so elastic is our trade with her that even the depression of last year failed to keep it down. It increased, being the only import trade with any country beyond ten millions a year which did not diminish, by upwards of a million sterling. To her also we export more largely than to any other country except India, Germany, and the United States. Our total trade with our Colonies at the Antipodes amounts to upwards of £40,000,000 annually.

This does not, however, give a complete idea of how important a factor those Colonies form in the commercial world. Their whole import and export trade reaches in money value the total of £94,633,518. The value of the general commerce of Belgium, justly considered one of the most prosperous of Continental States, with double the population, amounts to considerably less than twice this sum: whilst her trade with this country is under eighteen millions annually. The tonnage entered and cleared in Australian and New Zealand ports in the year 1877 was upwards of 7,000,000, nine-tenths of which was under the British flag. And in addition to all this, we should remember that there is a far from inconsiderable Mercantile Marine hailing from the Colonial ports, which goes to swell the enormous total of our maritime statistics.

Our Pacific relations, however, by no means end with our Colonies just noticed. Our annual trade with China is worth

twenty millions a year; with the French, Dutch, and Spanish possessions, and with Japan, nearly fifteen millions. With the Spanish American republics of the Pacific, we do business to the amount, in ordinary years, of nearly £14,000,000. In 1873 California sent us, chiefly in British bottoms, a quarter of a million barrels of flour, and some nine million cwts. of wheat. In fact, the magnitude of our shipping interests in the distant ports of those countries is one of the most striking features of our enormous maritime development of recent years.

Now the facts above stated prove how largely we are interested in all the commercial transactions of the Pacific coasts on both sides. They prove too how important it is that we should watch with care the progress of our business relations with the countries washed by its waters. Periodical statistics inform us that, with every advance in developing the resources of the newly-opened or settled regions that bound the great ocean, we continuously increase our share both of the general commerce and of the carrying trade. But as was indicated in a late number of this Journal, we are not without rivals evidently capable of taking advantage of every change which tends to the further enlargement of the maritime operations in which, in common with others, we are engaged. One of the most significant incidents of the commercial history of the last ten years is the rapid and continuous substitution of steam traffic for that carried on in sailing vessels. The effect of the completion of the Suez Canal on the trade with China has been most marked. Between 1871 and 1878, whilst the sailing tonnage remained practically stationary, the steam tonnage recorded in the Customs' returns of the "treaty-ports" increased by more than a hundred per cent. In the other, the Eastern, region of the Pacific, a corresponding, though a less considerable change in the relative proportions of the two classes of shipping has taken place. It is with this that those who look with interest upon the future of our Pacific trade should have most concern.

The steam navigation of that part of the world must, if the present promise of a still expanding commerce be fulfilled, continue to increase. Arrangements will have to be made which will enable us to conduct under steam the great traffic which is to a large

Q 2

extent carried on now under sail. We shall have to select suitable routes for steam-vessels, and convenient stations at which they may be able to call for coal. The very distances, especially in the western Pacific, will render a fresh set of conditions necessary. The completion of these arrangements is the problem before those whose interest it is to extend or even maintain our great Pacific trade.

The piercing of the Central American Isthmus, at whatever point it may be finally decided on to do it, may probably be regarded as a certainty of a not very remote future. As soon as it shall have been accomplished there is sure to ensue an enormous addition to the number of steamers which now traverse the waters of the Pacific Ocean. It is, perhaps, not without significance that, in view of the definite attempts now being made to cut the new canal, the French have formally annexed Tahiti to France. It looks like an official declaration that, in their opinion, the opening of the canal is not far from achievement. We may learn from it one thing, that to facilitate the development of British trade in the Pacific we must be prepared to replace much of the sailing tonnage which is now employed in it by suitable vessels with steam power.

TORPEDO VESSELS.

TORPEDOES and torpedo boats have for a long time been recognised as being likely to play an important part in naval warfare, but it is only within a comparatively recent period that a systematic provision has been made for them as a permanent part of the war material of our own and other countries. The advantage of a weapon striking under water, and with a practically illimitable force, against which no armour plating or strength of structure could provide a defence, has always been acknowledged; but it has on the other hand been thought that when required both the torpedoes and the means of using them could be readily extemporised, or could certainly be obtained so quickly that it was unnecessary to make

provision for them till we were actually at war. Provision of one kind was made by our own Government and others in the establishment of arrangements for torpedo practice, both for training and experiment. Recent developments in the construction of small vessels, and conclusions arrived at in regard to the torpedoes themselves, have taught that although much might be done with hastily-prepared torpedo boats, every war navy must now contain some vessels specially designed to use the new weapon. We propose, in the present paper, to place before our readers a summary of what has been done during the last few years in the way of systematic development of the use of torpedoes in naval warfare. We do not include in this the question of sub-marine mines for the defence of harbours or rivers, and shall confine ourselves to description of vessels designed specially to fight with torpedoes.

Like ironclads, torpedoes date their present important position from the American war. There were ironclads in existence before the *Merrimac* sank the Federal fleet in Hampton roads, but that event showed their enormous superiority to wooden war-ships; and torpedoes, or as they were formerly called infernal machines, had been many times proposed and even made, but first did actual service in the war of the Secession. So long ago as 1805, the celebrated Robert Fenton blew up a brig by way of experiment off Walmer Castle, with torpedoes ignited by a flint lock set off by clock work, and some were tried by the Russians against our fleet in the Baltic, but their powers for evil extended no further than the breaking of crockery, and they were easily fished up by the boats of our fleet.

In the American war several torpedo boat attacks were made, and great ingenuity and bravery were shown both in the design and execution of them. Of the two most notable and successful exploits, the first was performed in December, 1863, against the Federal sloop *Hoosatonic*, off Charleston. The torpedo was attached to a boom lashed to the deck of a small boat, which was constructed so as to be capable of diving when she got near the enemy. After no less than four crews had been drowned in successive attempts to work the boat, a fifth crew succeeded in

making the attack, the result being that the *Hoosatonic* was destroyed, but the boat was lost on her way back. She was propelled by a wheel turned by means of a crank worked by her crew, who were supplied with air compressed in tanks. In October, 1864, the Confederate ram *Albemarle* was destroyed at night by means of a steam launch, which carried a torpedo at her bow, but the boat was disabled and sunk by the rush of water from the explosion, and only two of her crew escaped by swimming ashore. Towards the close of the war, arrangements were made on both sides which doubtless would have resulted in a much more extensive use of boats built for the purpose, and with better arrangements for fighting the torpedoes.

The torpedo operations in the late war between Russia and Turkey were for the most part badly planned and indifferently executed, and do not add much to our knowledge of the whole subject. The most remarkable case was that which resulted in the destruction of a Turkish monitor in the Matchin branch of the Danube in May, 1877. The attack was made by means of four boats at night, but with some moonlight. The boat which led the attack had very noisy engines, and in consequence they were discovered, although but a poor look-out was kept by the Turks. When seen they were about 200 feet from the ironclad and hence were able to run under her quarter, being in that place out of the reach of the stern gun. The torpedo was attached to a pole and when fired made a large hole in the stern of the monitor, and as a result of the explosion large waves were produced which nearly sank the boat. The Turks fired on the attacking party from their sinking ship, till a second boat fired a torpedo under the monitor amidships and completed her destruction. This boat got entangled in the *débris* of the wreck and the first had some difficulty in pumping and baling, both being exposed to the fire of two neighbouring Turkish men-of-war, but they eventually got away safely. Several unsuccesstul attacks were on other occasions made, both by means of torpedoes attached to spars and by fish torpedoes. They appear not to have been very skilfully managed, and the circumstances connected with them do not point to any conclusions adverse to the generally efficiency of the weapon. The recent case

of the destruction of the Chilian transport *Zoa* by the Peruvians in the harbour of Callao, by the simple device of setting a boat adrift with 300lbs. of dynamite, covered with a false bottom resting on springs, and having a choice cargo of fruit and vegetables placed above, so arranged that, on its removal, the dynamite was fired, is an instance of a clever device which once successful may be considered to be played out, and has consequently nothing to do with our present subject. The incidents which we have thus briefly recounted, if they do little more, certainly serve to show that in any future naval war the torpedo is likely to play a much more important part than it has done in the past.

Many kinds of torpedoes have been tried, but for our purpose they may be divided into three classes: spar, towing, and fish torpedoes. The practical experience of the past has nearly all been with the first class, but the second and third kinds have been the subjects of many careful experiments. The first spar torpedoes used were made to explode by means of percussion fuses, fired by striking the enemy, but it was soon found desirable to introduce an arrangement to prevent the firing taking place by mere contact with a log or other floating body. The plan most in favour of late years is an invention of Captain McEvoy. A hemispherical cap, covering the end of the torpedo, is kept in its position by a spring, but is pushed back when it comes against a ship or other hard body. When this takes place, a metal plate to which it is attached is brought in contact with the ends of two electric wires, and thus completes the electric circuit, the effect being that an electric fuse attached to one of the wires is fired. The wires may be disconnected with the battery until the boat is near the enemy, and thus premature explosion of the torpedo is prevented. Also connected with the wire attached to the electric fuse is a third wire, whose end in the boat is so arranged that the electric contact may be completed by connecting it with the battery, and by this arrangement the torpedo may be fired at the will of the operator. This is designed to afford a means of firing when, on account of the direction in which the ship is struck, the first arrangement does not act. The spar to which the torpedo is attached has, in all recent boats, been arranged so as to be run out, or else to be lowered, when

approaching the enemy. The depth at which it is desirable to explode the torpedo depends upon the strength of the enemy. The explosion finds its vent in the direction in which it meets with least resistance, and it is therefore necessary that it take place at such a depth that it shall be easier for it to make a hole through the ship than to lift the column of water above it. The spar is of such a length that the boat should not suffer from the explosion.

The second kind we have to notice is the towing torpedo, invented by Captain Harvey. It is so formed, that when towed by a vessel it does not follow her directly but diverges at a considerable angle, and thus may be made to strike an enemy, although the towing vessel has passed at a considerable distance from him. It is a very ingenious contrivance, but appears to depend very much on skill in manipulation.

At present the balance of opinion appears to be against both the towing and spar torpedoes, and in favour of the "fish," of which the most important is Whitehead's. The disadvantage of the spar torpedo, of course, is that it can only be used by coming within the spar's length of the enemy. Its greatest chance is when a surprise is possible. It was thus used in the late war in the East, but this could hardly be done in the case of a ship having a well-disciplined and properly-commanded crew. If it be used in an attack by a small boat, failure means certain, and even success probable, destruction to the assailant, which is like the bee in not being able to sting twice.

The Whitehead torpedo is cigar-shaped, its shell being made of steel. It is divided into three compartments, the foremost one contains the charge of gun-cotton, which is put in just before it is used. The bulk of the cotton is wet, but is fired by means of a portion of dry gun-cotton, which is ignited by a detonating fuse when the torpedo strikes the enemy. The tail part is filled with compressed air, which furnishes the motive force, and the middle compartment contains the engine, by means of which the motive power is supplied to the two screw-propellers which work in opposite directions, and thus secure the "fish" travelling in a direct line. The pressure of the air is as much as 1000 lbs. per square inch, and the quantity carried in the full-sized torpedoes

will propel them 1000 yards at a speed equal to 16 knots per hour.

The chief difficulty to be overcome in the designing of an efficient fish torpedo, was to secure its moving at a uniform distance below the surface of the water. The exact arrangement for this is the secret of the inventor. It can be seen, however, that there is a horizontal rudder, and there can be no doubt that it is controlled in some way by mechanism whose action depends upon the pressure due to its depth in the water. The Whitehead torpedo is from 14 to 19 feet long and from 14 to 16 inches in diameter in the middle. Vessels fitted to use them have a machine provided, by which air is compressed into the chamber of the torpedo. Good practice has been made with the Whitehead, up to and in some cases beyond a range of 600 yards. Its reliable range, however, may be put down as about 450 yards. The average weight of the Whitehead torpedo is about 520 lbs., and each one costs £350.

Before closing this part of our subject, it may be desirable to make a brief reference to the experiments which the Government instituted at Portsmouth a few years ago, in order to ascertain the effect of torpedo explosions. The very large charge of 500 lbs. of gun-cotton was used, and the vessel experimented upon was an old wooden steamer called the *Oberon*, outside which was built an iron double bottom, similar to that of an ironclad. The result of the experiments showed that an explosion, 100 feet from the vessel, would do no damage at all; at 80 feet the engines would receive serious injury, but not till 40 to 50 feet would serious damage to the hull occur, and at 30 feet some animals which were placed on board were not injured.

An automatic torpedo, which was exhibited at the American Centennial Exhibition, appears worthy of notice, although we have not heard of any vessels having been fitted to carry it. It is known as the "Lay" torpedo, and its motive power was carbonic acid gas generated in one of its chambers by pouring sulphuric acid upon a carbonate. The most remarkable feature about it, however, was that it carried in itself a roll of insulated wire which was paid out as it ran through the water. By the electric

communication thus kept up, the electrician could steer, or stop, or fire the torpedo. It had guide poles projecting above the water to show its position. In an experimental trial one was sent a distance of a mile and a half from its starting point.

Vessels specially built for torpedo service may conveniently be divided into three classes :—

1. Sea-going torpedo vessels.

2. Harbour and coast defence torpedo vessels, known as "first-class torpedo boats."

3. Boats which can be carried on ship's decks known as "second-class torpedo boats."

The first vessel in the English Navy, designed specially for torpedo service, was the *Vesuvius*, built about 1875. She has a displacement tonnage of 260, and is propelled by twin-screws, but has a speed of nine knots only, which falls much below what is now considered necessary in all vessels designed for this service. The *Vesuvius* is fitted to discharge fish torpedoes under water, and carries ten of them. She was intended to do without a funnel, emitting her smoke from side ports, coke only being used as fuel.

A much more remarkable vessel is the *Polyphemus*, now building at Chatham, and so far advanced that she will most probably be launched early in next year and completed before its close. She is designed to depend mainly upon the torpedo and ram, and as she carries only a few small guns, no armoured battery will be necessary. Advantage has been taken of this to design her so that her armour everywhere can only be struck by shot at an acute angle. A complete cross section of the vessel is something like the shape of a pegtop, her greatest breadth being a little below water. The nearly flat upper part of the pegtop is the deck, and is 4½ feet above the water-line. Her skin above and six or seven feet below the water-line, including the deck, is formed of two thicknesses of half-inch plates of ordinary ship steel. Upon this comes a layer of inch plate of Whitworth compressed steel, and upon that again "scale armour," which last covers the side at some distance below water, but only extends over a part of the deck next the side. The "scale armour" consists of hard steel tiles, one inch thick and about a foot

square, attached by screws to the plates which they cover. The coamings round her hatchways and all openings in the deck are protected by glacis armour plates four inches thick.

Forward, the armoured deck is curved downwards and is carried under water to meet the spur ram which will project as much as twelve feet before the stem of the ship, and is so placed that it will strike an enemy so far under water as to be below his armour. The bow is made exceptionally strong to support the ram and to bear the effect caused by its striking an enemy, and the spur is so made that it can be unshipped and left ashore, a precaution taken with all the ironclads designed for H.M. Navy since the sinking of the *Vanguard* by a blow from the ram of her companion the *Iron Duke*. Under the ram is a port from which Whitehead torpedoes will be ejected under water right ahead in the same direction as the ship is going. There are also two broadside torpedo ports under water, and additional means of firing from the deck. It is obvious that a vessel of so peculiar a form should, in order to do her work properly, not vary much in her immersion. If too much side were exposed she would lose the great advantage of taking the shot at an acute angle, in consideration of which her armour is so thin compared to what is usual at the present time in ironclads of ordinary design. On the other hand if she were, by accident, such as the filling of some compartments with water, to sink even a foot or two deeper, she would, on account of her peculiar form, be subject to such a loss of range of stability as to be in a precarious position in a seaway. To meet this difficulty the system of subdivision into water-tight compartments adopted in all modern war vessels is carried out as far as possible. She has a double-bottom all through her length and extending as high as the deck. This is subdivided into a large number of cells, many of which are arranged so as to be used as coal bunkers, in order that if they are pierced when full of coal the resulting loss of floating power will be but small. The hold proper is also very much subdivided. Thus there are no less than four boiler rooms, two on each side of a vertical fore-and-aft bulkhead, which extends the whole length of the ship. A novel arrangement is also introduced to afford an available reserve of

buoyancy in action. In the place occupied in most ships by the keel plate there is a groove 3 feet deep and 1 foot 8 inches wide, which is intended to receive cast-iron ballast in short lengths, to be so carried that it can, if desired, be dropped in action. In the event of any compartment being pierced, ballast will be let go to such an extent as to preserve the draught and trim of the ship. The total weight of the ballast is 300 tons, which is equivalent to a little over a foot immersion of the vessel. The *Polyphemus* is 240 feet long, 40 feet extreme breadth, and has a load draught of 20 feet, and a load displacement of 2,600 tons. She will be propelled by twin screws, and her estimated speed is 17 knots. The cabins and accommodation for the crew will be ventilated artificially and lit by the electric light. Having thus described the hull proper, it remains to be said that like most of our low freeboard turret-ships she has a hurricane deck of light construction. This extends two-thirds of her length, and on it the boats, &c., are carried. Through it project the funnels, a signal mast, and an armoured pilot tower. The latter is at the fore end of the hurricane deck, and contains the steering wheel, telegraphs, &c., and from it the whole of the operations in action will be controlled. A few light shell or other guns for use in case of boat attacks are mounted on the top of the hurricane deck. For purposes of offence the *Polyphemus* will rely upon her ram and torpedoes only. She is in many respects an experiment, and is designed to embody the views of Admiral of the Fleet Sir George Sartorius.

Other ironclads of the English, and of some of the European navies have special arrangements for firing the Whitehead torpedo under water, and all war vessels could, of course, fire it from tubes above the water mark, but there is no other large vessel designed to depend to so large an extent upon this weapon as the *Polyphemus*. Midway between her and the torpedo boat are some unarmoured torpedo vessels, one at least of which has some remarkable characteristics. The American vessel *Alarm* is deserving of notice, if only for the fact that she was built by the people who have had the greatest practical experience of the use of the new weapon, and that she was designed by Admiral Porter, who distinguished himself so much in the Civil War. She is 172 feet

long, has a breadth of 27½ feet, draws 11 feet of water, and has a displacement tonnage of 700. She is framed upon the cellular system, usual in English and other ironclads, and is well divided into compartments, but is not armoured. Her deck is but 3 feet above the water, and her estimated speed is 15 knots. She is armed with one large 15-inch gun, fired through a bow port, and has a very long spur ram. The *Alarm* is intended to use spar torpedoes, and has three spars, one on each broadside and one at the bow. The spars are of iron, hollow, and the torpedo, which is attached to the end, is fired by an electric fuse, so adjusted, that when the current passes, a piece of platinum wire becomes red hot and fires the fuse. The firing arrangements admit of the current being passed either on the torpedo striking the enemy, or at the will of the officer in charge. The side spars are each 14 feet long, the bow spar is 32 feet. The *Alarm* has a novel kind of propeller, which revolves horizontally on a shaft formed by the after stern-post of the vessel. The propeller has four feathering blades, and its force can be delivered in any required direction by regulating the feathering of the blades. This is done by means of an eccentric worked by the helm. It is believed by the inventor that this propeller affords a readier means of steering the vessel than can possibly be obtained by any rudder. It was believed that the *Alarm* would obtain a speed of twelve knots, but when she was tried at the measured mile in January last she did not exceed ten knots. The Americans have also in hand a vessel designed for torpedo service exclusively, named the *Intrepid*, of 1,123 tons displacement, which was launched in 1873. Her dimensions are: length, 170 feet; beam, 35 feet; draught, 12 feet; and her speed is only nine knots.

The first vessel built for torpedo service and protected by armour plating was the *Spuyten Dyvil*, which was commenced by the United States Government during the Civil War, but was not completed in time to be of any use. Her dimensions are 74 feet long, 20 feet beam, and 7½ feet draught, but she could be immersed on going into action to a depth of 9 feet, in order to put her unarmoured side below water. It was intended that only the deck should be above water when going into action, and this was

plated with 3-inch armour. Amidships, and standing about 3 feet above the deck, was a pilot-house, from which the vessel was to be steered, &c. The torpedoes were to be worked through a hollow iron boom projecting from the bow, and having inside it a rod to which the torpedo was to be attached. The torpedo was to be fired by contact when a detonating cap was struck. The *Spuyten Dyvil* was said to have engines that were noiseless. We believe that they were of very low power compared with similar vessels in the present day. She was built of wood, and if in existence at the present time it is most probable that her timber, especially that in contact with the iron armour, is so far decayed that she would be useless.

In the Imperial German Navy there is a torpedo vessel somewhat larger than the *Alarm*, named the *Zeiten*. She was built in 1876 at the Thames Iron Works, London, and has a length of 226 feet, breadth 28 feet, and depth 18½ feet, with a displacement tonnage of 975, and a draught of 12 feet. She attained on trial a speed of 16·3 knots. The *Zeiten* is intended to fight with the Whitehead torpedo, and has two tubes for that purpose, each 6 feet below the water-line ; one is placed forward and one aft, and their direction is that of the keel of the ship. The forward tube has its outlet about 16 feet back from the stem in the fore body of the vessel, and a part of the plating of the ship is made to lift up when the torpedo is to be used, and to drop down afterwards, so that thus the torpedo port does not detract from the speed.

The Swedish torpedo vessel *Ran*, built in 1877, at Stockholm, is a somewhat smaller vessel, her displacement tonnage being 638. She has a speed of only 12·8 knots. The *Ran* is intended to make use of the Harvey towing torpedo, and is also fitted with arrangements for using the Whitehead fish torpedo, of which eight are to be carried on board, but twelve could be carried if desired. There is a vessel of this class in the Italian Navy, named the *Pietro Micca*, but while she is of less displacement (535 tons) she is designed for a speed of 18 knots. The vital parts of the vessel are protected by an armoured deck, a little below water, consisting of ··er of steel plates $\frac{9}{16}$-inch thick, and two layers of iron each $\frac{13}{16}$ thick, making a total thickness of about 2¼ inches. The

Pietro Micca is armed with ten Whitehead torpedoes, which are projected from tubes under water. The Italians have two other torpedo vessels on the slip. The Argentine Government have a vessel of 620 tons displacement, named the *Fulminante*, which is intended for torpedo service, and also to be employed in laying submarine mines, and the Portuguese Government have a much smaller vessel of the same name and for similar service. Both of these vessels are of comparatively low speed.

For some time after the importance of the torpedo in naval warfare was appreciated, our own Government were content to make arrangements for using for that service the ordinary steam launches carried by men-of-war. These were subject to the disadvantages of being very slow and very noisy. Messrs. Thornycroft, of Chiswick, in 1871, demonstrated the feasibility of obtaining high speed out of very small vessels, and for the history of the early designing of small craft specially adapted for torpedo warfare we are indebted to a paper read before the Royal United Service Institution, by Mr. John Donaldson of that firm, in May, 1877. The first high-speed boat was built by them for the Norwegian Government in 1873. She was 57 feet in length, 7½ feet beam, drew 3 feet of water, and was to have a speed of 16 miles or nearly 14 knots; she was constructed entirely of steel, and was divided into six compartments by water-tight bulkheads. Of these the extreme end compartments are occupied by stores, the two next to them are fitted with seats for the crew, and have moveable steel covers to enclose them in bad weather or on going into action. The two midship compartments are covered completely by steel plating $\frac{3}{16}$-inch thick to keep out musketry bullets; one is for the steering gear, the other for the machinery. There is a hood with slits in it to enable the steersman to see all round and yet be out of danger from the enemy's riflemen. The engines were compound with surface condenser, and developed 90 indicated horse-power. This vessel was intended to be armed with a towing torpedo, the towing gear being attached to the funnel; the required speed was obtained, but the builders were not satisfied with the performance of the propeller, and Mr. Thornycroft invented one which is a modification of what is known as the

Dundonald propeller. In the last named the blades are inclined backwards but are straight. In Mr. Thornycroft's they are curved, the curve being of such a character that the blade has a greater inclination to the axis at the boss than near the tip; the speed then obtained was 15 knots per hour. This boat was followed by two others for the Swedish and Danish Governments respectively. Further improvements were made in the machinery, the result being in the case of the Swedish boat a speed of 15¾ knots per hour. The Danish boat was armed with towing torpedoes, and it is worthy of remark that when actually engaged in towing one of them her speed was reduced to 10 knots. This fact must tell very much against the efficiency of any towing torpedo except it be towed by a much larger vessel. These boats were of course of very light construction, and some misapprehension was expressed as to their strength, but it is stated that the Norwegian boat was through some mistake out in the open sea of the Baltic in rough weather, and not only behaved well but showed no signs of weakness. The next boats were built by Messrs. Thornycroft —two for the French, and one for the Austrian Governments. Their dimensions were: length, 67 feet; beam, 8½ feet; draught, 4½ feet; indicated horse-power, 200. The plates in these boats were slightly thicker, and the spaces occupied by the crew were permanently covered in. The armament consisted of two torpedoes on wooden poles about 43 feet long, fired by electricity, either on contact with the enemy or at the will of the operator. The poles were run out through tubes attached to the deck of the boat, and so arranged that the poles might be placed either over the bow or from the broadside. These boats made over 18 knots per hour, and the French boats were considered so far fit for service in rough water, that they steamed from the Thames and crossed the Channel in a direct line from Dover to Cherbourg. The French authorities, after trial of the boat, made an alteration of the spar arrangements, deeming it advisable to fight her end-on only, as then she was less liable to damage herself by the shock of the explosion. They fitted each [illegible]at with a steel pole 40 feet long, when run out the fore [illegible]s depressed to about 8½ feet below water. The somewhat

sensational experiments at Cherbourg were made by the help of these boats, and upon the *Bayonnaise*, an old wooden frigate. Of course, an immense hole was made in the wooden ship. It was said at the time that it was so large that an omnibus might be driven through it. The value of the experiments was not in proving, what everybody knew before, that a large torpedo explosion would make a big hole in a wooden ship, but rather as showing the effect of the explosion upon the boat herself. The boat, it is said, was completely covered by the water of the large wave raised by the torpedo, but was not in any way damaged, and steamed away from the scene of the experiment. The second boat ran into the ship by misadventure, and her bow was doubled up, but no damage resulted beyond the filling of the empty space in the fore-compartment. A third size of boat was built for the Dutch and Italian Governments; these are 76 feet long and 10 feet beam, and have a speed of 18 knots. They have more freeboard to enable them to be out in rougher weather, and their horse-power is 250 indicated. The Dutch boats had spar torpedoes; the Italians were designed to carry the Whitehead fish torpedo.

The first torpedo boat built for our own Government was the *Lightning*, in 1877. Her dimensions are: length, 84 feet; breadth, 10¾ feet; draught, 1½ feet forward and 5 feet aft, the latter including turn down keel which encloses the propellers. Her speed is 10 knots; indicated horse-power, 350. The *Lightning* has superior sea-going qualities to any of the former boats; she has thicker plating, and superior cabin accommodation. She was designed to use the Whitehead torpedo discharged through a tube above the water. Mr. Donaldson's paper brings down the history of Messrs. Thornycroft's torpedo boats to May, 1877, and he mentions in it six torpedo boats which were then in hand for the French Government. They were 87 feet long, and 10½ feet beam, and were to have a speed of 18 knots. It may be remarked that in most of the small boats the propeller was placed abaft the rudder, but this was not the case in the larger vessels fitted for rougher water. The last-named French vessels were to have their frames and plating galvanised below the water. We may add that the six French boats were completed and tried in June, 1878, with

results varying from 18·1 to 18·9 knots per hour on a three hours' run. When steaming at this high rate of speed the consumption of coal was in some cases as much as a ton per hour, and the bunkers hold but five tons, but, of course, in steaming easy, the consumption is very much less. One vessel, it is stated, steamed from Chiswick to Cherbourg in twenty-two hours, on a total consumption of only two and a half tons of coal. The six boats are primarily designed for the defence of Cherbourg, but would be available for any part of the English Channel.

At the present time our own Government have two classes of torpedo boats, a first-class intended for harbour and roadstead defence, too large to be carried by ironclads or cruisers as part of their equipment, though two of them have been sent to Gibraltar and Malta respectively on the deck of a transport ship. The first-class boats are mostly about the size of the *Lightning*. Twelve of them have been built by Messrs. Thornycroft, and in the latest a speed of 22 knots per hour has been obtained, with about 450 indicated horse-power, on a displacement of 30 tons. The details of this boat, with drawings, were given in a recent number of *Engineering*, from which we abridge a brief description, which will give our readers an idea of the latest development of this remarkable class of vessels, so far as the firm are concerned, who, we believe, have built the largest number of them. The hull is built of Bessemer steel, galvanized, or coated with zinc; the deck is also steel, covered in places with cement for foothold. The hatches to engines, boilers, and fore-compartment are fitted with springs, which throw them wide open when the fastening is withdrawn, so as to facilitate egress in an emergency. The hull is very much sub-divided by numerous bulkheads and partial bulkheads. The first large compartment is that for the crew, and abaft it is the steering compartment, above which is a conning tower, having at hand the telegraph gear, the voice-pipe to the engine-room, and the starting-gear for the torpedo discharging tube. Abaft this is the boiler compartment, with coal-bunkers at the sides. A peculiarity of the stokehole is that the only exit for air is through the furnaces, by which means is maintained the artificial draught necessary to the rapid combustion required to develope the necessary high power. The engines are

in a compartment next the boilers, and abaft that is the accommodation for officers. The shaft is inclined to the water-line so as to bring it out aft with its centre only just above the under side of the keel. By this arrangement half the area of the propeller's revolution is below the boat, and thus is obtained the double advantage of a large propeller and a good supply of water for it to act upon. The stern-post abaft the propeller, and to which the rudder is hung, is only attached to the hull of the vessel above water.

We may add that the thickness of the plates of the first class torpedo boat is $\frac{1}{8}$-inch amidships, and rather over $\frac{1}{16}$-inch forward and aft. The total cost is £8,000, of which £6,000 is for the hull and engines and £2,000 for the torpedo gear.

Besides the twelve first-class torpedo boats which we have stated have been built by Messrs. Thornycroft for the British Government, they have seven others of about the same size. One which was built for them by Messrs. Yarrow, of Millwall, and completed in the early part of last year, attained the then unprecedented speed of 21·9 knots; two others were purchased from the same firm, who were building them to the order of a foreign Government. Other boats of lower speeds have been built: one each by Messrs. Hanna, Donald and Wilson, of Paisley; J. White, of Cowes; Rennie, of London; and Maudsley, of London. The last-named was built of brass, we believe, as an experiment to compare in point of duration with the others. It is not apprehended that when proper precautions are taken there will be any marked amount of loss from corrosion in the boats built of Bessemer steel, but a very small loss indeed would soon tell on the very thin plates of which these boats are built, and it may possibly turn out that if the existing type of torpedo boat retains for long a place in the Navy, it may be cheaper in the end to build them of brass than of less durable material. The first class boat is, as we have said, intended chiefly for harbour defence. One only of the nineteen is armed with the spar torpedo, the others carry each three Whitehead fish torpedoes, which are discharged singly by an air impulse through a tube or air gun mounted on the fore part of the deck, and commanding a large angle of training.

The second class torpedo boat is intended to be carried by large

ships of war. The usual dimensions of this class are 60 feet length, 7½ feet beam, indicated horse-power 120 to 150, giving a speed of 16 to 17½ knots, with a displacement of about 12 tons. There are at present between 40 and 50 of these built or building. Each boat carries two Whitehead torpedoes in slings over the side, but it is believed that they will, like those of the first class, soon have arrangements for discharging the torpedoes through a tube, thus securing greater precision. The second class torpedo boats have $\frac{1}{16}$-inch plates throughout. The boat and engines costs £2,500, the torpedo gear £300. Several of our large ironclads and cruisers carry each two torpedo boats of this class. One ship, the *Hecla*, which was purchased two years ago, on the slip, at Belfast, where she was built, by Messrs. Harland and Wolff, for the British Shipowners' Company, is specially set apart for torpedo service. The *Hecla* was built for the Atlantic passenger trade, and was purchased by the Admiralty for conversion into a war ship, to become a type of the cruisers which would be obtained from merchant shipowners, and fitted for fighting purposes in the event of war. Subsequently she has been further developed into a torpedo ship. She herself has arrangements for discharging Whitehead torpedoes, carries six torpedo boats, and could also be used for preparing and laying submarine mines.

In addition to the boats we have described and enumerated it is also the practice in the Royal Navy to fit the ordinary steam launches and pinnaces to carry Whitehead torpedoes over the side. These boats have, however, one important defect, viz., that their speed does not usually exceed 9½ knots. With a view to having a boat which should be able to do the ordinary duties of a steam lifeboat and at the same time be available for torpedo service, the Admiralty have recently had some designed of a new type. The first six of them were completed in May last, by Mr. J. T. White, of Cowes. They are built of wood, upon the diagonal principle, are propelled by twin-screws, and have realised a speed of over 13 knots. The total weight of these boats fully equipped is 152 cwt. They are available for ordinary boat service, would [illegible]nd more knocking about than the thin light torpedo boats, [illegible] though they have somewhat less speed, an important draw-

back, it is probable that they would be available at sea in rough weather when the boat built only for speed would hardly be safe.

There are two drawbacks to the use of existing torpedo boats for which various remedies have been proposed. The first and most serious is the discharge of smoke and sparks through the funnel which make known the vessel's presence to the object of attack. The second is the difficulty of steering with the ordinary rudder at the very high speeds obtained. In a recent boat built for a foreign Government, Messrs. Yarrow attempted to remedy the first defect by discharging the smoke through side ports, the side being used which was farthest from the enemy, and the port having valves which are kept open by the blast and closed by any large wave. The arrangement was only available in fine weather, and a temporary funnel had to be rigged on other occasions. The same boat has also, in addition to the rudder aft, a rudder placed about 10 feet from the bow, both being worked simultaneously by connection with the same steering-gear. The forward rudder can be raised within the vessel when she is going at her low speed and when it is not required. It is said that on the trial of the boat, it was found that at high speeds the forward rudder was more useful in steering the boat than the after one. Another novel design was the Herreshoff torpedo boat, built last year for our Government by a company of that name at Rhode Island, U.S.A. Her engines are in the fore part of the vessel and by means of an inclined shaft, which for most of its length is below the keel of the boat, turn a propeller which revolves entirely below the keel, and in the midship part of the vessel. The rudder is aft and is also entirely below the keel. The boat can be propelled a-head or a-stern with equal speed and steers well. With two torpedoes on board, the total weight including fuel and crew of four men is $7\frac{1}{2}$ tons. She attained on trial a speed of 16 knots. The Herreshoff boat is $59\frac{1}{2}$ feet long, $7\frac{1}{2}$ feet beam, and $5\frac{1}{2}$ feet depth, of which more than 4 feet is above water. She is covered in above with $\frac{1}{16}$-inch steel plates, but her bottom is planked with wood on steel frames and with five steel watertight bulkheads. This boat has a special kind of boiler, consisting of two continuous coils of pipes enclosing the combustion chamber. It is said that steam can be got up in five

minutes, and there is not so much danger from explosion as in an ordinary boiler, both special advantages in a torpedo boat. The Herreshoff boat as regards power of manœuvring is considered a success, and her boiler with some modifications is also likely to be adopted.

We believe that the Government of Russia has gone more extensively into torpedo boats than that of our own or any other country. It is said that they have as many as a hundred of these vessels. The greater part of them were either acquired or ordered during the war with Turkey. Ten of them were built by Mr. S. Schichan, of Elbing, in Prussia, and are notable as having made the longest run under steam ever accomplished by vessels of this character. These boats are 66 feet long by 11¼ feet beam, and are built of steel plates about one-eighth of an inch thick. In July of last year they steamed from Elbing to Cronstadt, a distance of 630 knots. They had to put into ports several times on account of very bad weather, but for the time they were under steam averaged 12 knots per hour, and it would appear that they would be available for service along the Baltic coast of Russia in all but exceptionally bad weather. These boats attained on trial a speed of over 17 knots per hour.

As many as thirty of the Russian torpedo boats were built by Messrs. Thornycroft. One boat, the *Wrzic*, which was built in 1877, at St. Petersburg, is of larger dimensions than most vessels of this class, being as much as 120 feet long and 16 feet beam, her speed being 17 knots. Messrs. Yarrow have also recently built a large boat for the Russian Government, 100 feet long and 12½ feet beam, her armament consisting of as many as six Whitehead torpedoes. In this boat, as in some others of recent design, the tubes used for firing the torpedoes are built into the vessel and covered by a turtle-back deck which slopes up to the conning tower, in which, not only is the boat steered, &c., but the starting-gear for the torpedoes is worked. The whole of the men engaged in the service are by this arrangement under cover, and are thus protected from rifle bullets. The speed of this boat is 22 knots.

The power which, next to England and Russia, has most torpedo ›ts, is France, which has at present as many as fifty. The

earlier boats in the French Navy were designed to be armed with spar torpedoes; those of the last type built in France are to carry the Whitehead, and are of 33 tons displacement, and 92 feet long, with a speed of 19 to 20 knots. The plates are of steel, and are said to be three to five millimetres (roughly two to three-sixteenths of an inch) thick.

Our own Government has been blamed for not having gone in for torpedo boats more extensively and at an earlier date. They were certainly rather behind hand in adopting the new engine of naval warfare, but we think that possibly they were, and are right in exercising some caution as to the amount of money to be spent upon vessels which may be superseded in a few years by others, perhaps faster and more efficient. The mere fact that Russia in so short a time got together so large a number as a hundred would indicate that this branch of the Navy is one in which we may to some extent trust to our great facilities for rapid increase when the boats are likely to be required. In this regard it is worthy of note that the large majority of torpedo vessels, of all sizes, have been built in England.

Large ironclads take years to build, and no amount of money can in an emergency make up for lost time, as far as they are concerned, but, as regards the small torpedo craft, it would appear to be the wisest course to increase their numbers gradually, thus acquiring experience as to the respective capabilities of various classes of boats. It must also be remembered that these vessels are of necessity comparatively short-lived. They trust to their high speed for safety in presence of a heavily-armed enemy, who has difficulty in hitting a rapidly moving object, and high speed is obtained by cutting down the weight carried to a minimum—hence the plating is of necessity so thin that a very small amount of deterioration tells heavily upon it.

It is difficult, in the present state of our knowledge, to estimate the relative importance of the torpedo boat in naval wars of the future. In the defence of harbours it, in combination with submarine mines, will doubtless be largely used, but in a great battle on the high seas our present experience would appear to indicate that the big gun and the ram will both be more important weapons than the torpedo.

ON COMPASSES, AND THEIR ADJUSTMENT IN IRON SHIPS.

(Concluded from page 903.*)*

THE HEELING ERROR. — All that has been said so far relates to a ship when upright, that is, to a ship on an even beam and keel, which should be her position when swung for the deviation of the compass, or for the adjustment of any of them; and be it remembered that though the compasses have been adjusted in respect to the semicircular and quadrantal co-efficients, the effect of the correction is not such as to efface, though it may mitigate, the heeling deviation.

The following diagrams, 32 and 33, in respect to a ship built head towards North in the northern hemisphere, illustrate the effect of the magnetism as she heels over; and the worst possible position for a compass in such a ship is near the stern, for there all the forces conspire to magnify the error.

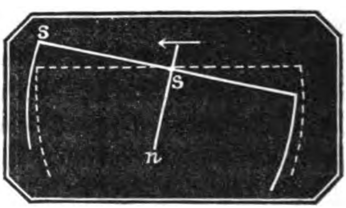


FIG. 32.

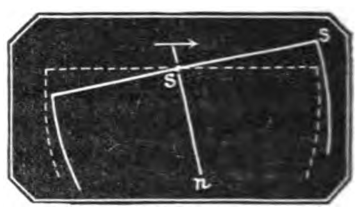


FIG. 33.

It is easily seen that, as the ship heels over, the transverse iron, such as the deck beams, becomes magnetic as it inclines, and the upper or weather end, *s*, (with *blue* magnetism) attracts the N. (*red*) point of the needle; further, the upper end of the soft iron, which, before heeling, acted vertically below the compass and did not disturb the horizontal needle, is now with its *s*, or *blue* magnetism, brought out to windward, and is consequently an additional force pulling the N. point of the needle to windward; to this must be added the effect of the vertical force of the sub-permanent magnetism, which, according to circumstances, may act

upwards or downwards. The heeling deviation is, in this case, to the high or weather side, whether heeling to starboard or port.

Since, however, the effect of induction will be changed at the magnetic equator, and will be reversed, as the upper end of the iron acquires magnetism south of the equator, the heeling error, to state a general case, arises from the following causes:—

1. Vertical induction in transverse iron, which draws the N. end of the needle to windward in N. latitudes, and to leeward in S. latitudes.

2. Vertical force arising from sub-permanent magnetism; and vertical induction in vertical iron; which, in the usual position of the steering (aft) compass, draws the N. end of the needle to windward in ships built head North, to leeward in ships built head South.

Hence, an iron ship, built head North, will generally have a large heeling error to windward in N. latitude; and a small heeling error, which may be to windward or to leeward, in S. latitude.

Also, an iron ship, built head South, may be expected to have a small heeling error to windward or to leeward in N. latitude, and a considerable heeling error to leeward in S. latitude.

The heeling error being a *maximum* on the North and South points by compass, and *nil* at East and West, it is evident that the coefficient C is that which must be most affected, and if the deviation for an upright ship be,

$$d = \text{B} \sin z + \text{C} \cos z + \text{D} \sin 2z$$

we shall have, for a ship heeling n degrees, with c taken to be the change in C for one degree of heel, the following formula—

$$d_n = \text{B} \sin z + (\text{C} + c\, n^\circ) \cos z + \text{D} \sin 2z$$

$$\text{or, } d_n = d + c\, n^\circ \cos z$$

that is, the heeling error alters proportionally to the number of degrees of heel and the *cosine* of the azimuth of the ship's head.

It is possible to put this, for practical purposes, in a more simple form. Since, *in the northern hemisphere, in the majority of iron ships, the North end of the compass needle is drawn to windward* (to the weather, or high, side) when the binnacles are above

the upper deck, the following results, as neatly put by Captain Evans, R.N., would arise from a disregard of this heeling error:—

"If the ship be kept steady on one compass course, she will be found to windward of her supposed position when on northerly courses; and to leeward on southerly courses. If she be steered steadily for a fixed point on the horizon, she will *appear* to fall off as she heels on northerly courses, and to come up on southerly courses." Therefore, as *a general rule*, it should be borne in mind "that in steering by compass and wishing to make a *straight course*, we must keep away, by compass, on either tack, as the ship heels, when on northerly courses; and keep closer to the wind, by compass, on either tack, when on southerly courses."

Every seaman will apprehend this plain language; but to express the *heeling deviation in terms of the deviation when upright*, the following are the results:

On Northerly Courses,—

Starboard tack,—E. dev. is increased, W. dev. is decreased.

Port tack,—W. dev. is increased, E. dev. is decreased.

On Southerly Courses,—

Starboard tack,—W. dev. is increased, E. dev. is decreased.

Port tack,—E. dev. is increased, W. dev. is decreased.

And it can easily be understood that when the upright deviation is small in amount and decreases from heeling, it may go to the extent of being reversed in name.

Observe further that there is a correspondence between the starboard tack on Northerly courses and the port tack on Southerly courses; also between the port tack on Northerly courses and the starboard tack on Southerly courses.

When the *North end of the compass needle is drawn to leeward*, the *rule* above is of course *reversed*.

As some may better understand the *naming of the heeling error* if given *according to the tack*, it can be expressed as follows:—

1. *When N. end of the compass needle is drawn to the weather side*—

On starboard tack, heeling error is E. on Northerly courses;

" " " W. on Southerly courses.

On port tack, heeling error is W. on Northerly courses;
,, ,, ,, E. on Southerly courses.

2. *When N. end of the compass needle is drawn to the lee side*—
On starboard tack, heeling error is W. on Northerly courses;
,, ,, ,, E. on Southerly courses.
On port tack, heeling error is E. on Northerly courses;
,, ,, ,, W. on Southerly courses.

Finally it may be observed that—

1. If, on changing tack, the course is changed from Northerly to Southerly, or from Southerly to Northerly, the heeling error does not change its name.
2. If, on changing tack, the course still remains Northerly, or still remains Southerly, the heeling error changes its name; also—
3. If, without tacking, by a change of wind the course changes from Northerly to Southerly, or from Southerly to Northerly, the healing error changes its name.

These observations do not apply to the amount of heeling error, which of course, depends on the extent, or number of degrees, of heeling.

The amount of heeling error with the ship's head North or South, on which points it is a *maximum*, varies greatly in different ships. Something between $\frac{1}{2}°$ to $2°$ for every degree of heel is by no means unusual, and it has been found to be as large as $3°$; in very rare instances the latter amount *may* be exceeded, but there is no sufficient proof of this. The amount of heeling error in one ship is no criterion for estimating that in another, though both ships may have been built in the same magnetic direction.

To Adjust the Compass, or Correct the Deviation, with Permanent Magnets and Soft Iron.—It is taken for granted that the reader understands the use of azimuthal bearings—it may be of a distant object on shore—or reciprocal, as is sometimes compulsory—or of a celestial body, as the sun, a planet, or a fixed star; any of which may, according to circumstances, and the locality, be employed while swinging a ship, and bringing her head to any given number of *correct* magnetic directions, for the purpose

of making a deviation table for the various points of one or more compasses, or of correcting the deviation by permanent magnets and soft iron.

But it should be well understood that, for use on board ship, no instrument is preferable to the *dumb card*, or compass card without a needle, from the facilities it offers in the comparison of compass readings, and the rapidity with which the *correct* magnetic direction of the ship's head may be determined.

In placing a compass have it well raised above the iron beams, as far as convenient from an iron bulkhead, and, if possible, not within six or seven feet of any vertical iron. Take care to have the lubber's point in the midship fore-and-aft line.

The card of a compass, to be properly adjusted, should not have less than two parallel needles of great directive force, placed edgeways, *fixed* to the card, and 60° apart. The pivot on which it moves should be of hard steel, well pointed but not needle-like, and perfectly smooth. The central stone should be a hard gem, with the concavity well rounded and polished; an agate is not to be trusted, though some are very hard. The card resting on its pivot should be truly horizontal. The ship should be perfectly upright.

These conditions being fulfilled we may proceed to adjust compasses; and if you choose, and cannot trust your eye, you may draw two chalk lines—one fore-and-aft, and the other athwartship—crossing each other under the centre of the compass.

With the ship's head on *correct* magnetic North or South, if the compass by its indication shows any deviation, the *compensating* bar-*magnet* must be placed *athwartship*, either before or abaft the compass (it matters not which), the middle of the magnet on the midship fore-and-aft line with the centre of the compass, and the N-marked end (*red* pole) of the magnet, directed to that side of the ship towards which the N end of the compass-needle appears to be drawn: thus, the *red* (N) pole of the bar magnet must be to starboard if the deviation is Easterly with the ship's head North, or Westerly with the ship's head South (this is + C); but the *red* (N) pole of the magnet goes to port if the deviation is Westerly with the ship's head North, or Easterly with the ship's head South (this is – C). Begin

by placing the magnet at a distance from the compass, and then gradually approach it until the compass shows, by the lubber's point, that it indicates (within 1°) the *correct* magnetic point (N. or S.) to which the ship's head has been brought by the bearings. You must rather under-adjust than over-adjust; this can be remedied, if need be, when coming to the opposite point. Finally, with a small magnet, draw the compass about 8° or 10° from its lubber's point indication, and note if it returns to, and steadies at, its former apparent direction: does it do so, you are sure that the correction is good. Throughout this operation, be careful to observe that the ship's head is on its N. or S. azimuth.

Having commenced at North or South, next proceed to East or West; it matters not which. The method is similar to that already described, except in so far as regards the disposition of the compensating magnet.

Having brought the ship's head *correct* magnetic East or West, then, if there is any deviation, the *compensating* bar-*magnet* must be placed in a *fore-and-aft* direction, either on the starboard or port side of the compass (it matters not which), the middle of the magnet on the 'thwartship line with the centre of the compass, and the N-marked end (*red* pole) of the magnet directed to that part of the ship towards which the N. end of the compass needle appears to be drawn: thus, the *red* (N) pole of the bar-magnet must be aft if the deviation is Westerly with the ship's head East, or Easterly with the ship's head West (this is − B); but the *red* (N) pole of the magnet goes forward if the deviation is Easterly with the ship's head East, or Westerly with the ship's head West (this is + B). For the rest proceed exactly as before indicated for the correction of the N. or S. point, not forgetting to under-adjust rather than over-adjust; seeing that the ship is steadied to the azimuth; and testing the accuracy of the adjustment.

A few diagrams will illustrate, in respect to the compass, the disposition of the compensating magnets.

Fig. 34 shows a ship, built head East (giving co-efficient + C), brought with her head *correct* magnetic North, and the consequent attraction of the N. end of the needle to the starboard side compensated by a 'thwartship bar-magnet, the N.-marked (*red*) pole of

which lies to starboard, and thus repels the N. end of the compass needle to its normal *correct* magnetic direction.

FIG. 34 + C.

FIG. 35 − C.

Fig. 35 shows a ship, built head West (giving co-efficient — C), brought with her head *correct* magnetic North, and the consequent attraction of the N. end of the needle to the port side compensated by a 'thwartship bar-magnet, the N.-marked (*red*) pole of which lies to port, repelling the N. end of the compass needle to its normal *correct* magnetic direction.

Fig. 36 shows a ship, built head South (giving co-efficient + B), brought with her head *correct* magnetic East, and the consequent attraction of the N. end of the needle towards the bow compensated by a fore-and-aft magnet, the N.-marked (*red*) pole of which lies forward, and thus repels the N. end of the compass needle to its normal *correct* magnetic direction.

FIG. 36 + B.

FIG. 37 − B.

Fig. 37 shows a ship, built head North (giving co-efficient — B), brought with her head *correct* magnetic East, and the consequent attraction of the N. end of the needle towards the stern compensated by a fore-and-aft magnet, the N.-marked (*red*) pole of which lies aft, and thus repels the N. end of the compass needle to normal *correct* magnetic direction.

io bar-magnets in these illustrations have been shown to

correct the deviation of ships built heading on one or other of the four cardinal points; but it is only occasionally that a magnet in one position (athwartship or fore-and-aft) is sufficient for the compensation, since the majority of ships must be built on one or other of the remaining 28 intercardinal points; and thus a magnet in each of the two positions will most probably be required. Hence, besides the disposition of the magnets in Figs. 34, 35, 36, and 37 there must be four others, viz., for the combinations of B and C as given at the foot of p. 804; and Fig. 38 may be taken to represent a ship, after adjustment, lying head East, but having been built heading in a N.Wly. direction, and hence with — B and — C; the disposition of the compensating magnets is a combination of Figs. 35 and 37.

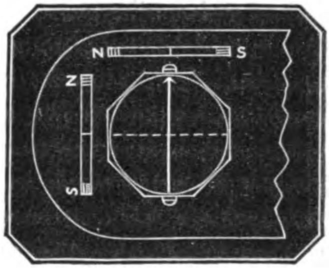


FIG. 38 — C — B.

A ship built head N.Ely. (— B and + C) would require a combination of Figs. 37 and 34; built S.Ely. (+ B and + C), a combination of Figs. 36 and 34; and built S.Wly. (+ B and — C), a combination of Figs. 36 and 35.

The bar-magnets compensate only the semicircular deviation.

Fig. 38 also illustrates the position of the correctors on the starboard and port sides of the compass for a *positive* quadrantal deviation. The ship having been swung for the correction of two adjacent cardinal points, and the magnets placed in their respective positions, she is then brought to one of the quadrantal points, N.E., S.W., N.W., or S.E.; the first two points have Easterly, and the last two Westerly, deviation, for which soft iron in some form, and to starboard and port, is applied on the same level as the compass needles. A *minus* quadrantal deviation, which would require the correctors to be before and abaft the compass, is so rare, and even then of such small amount, that it may be dismissed by just mentioning its possible existence. The correctors may be soft iron chain in brass boxes; or elongated or spherical cast iron. I am surprised that no enterprising optician has tried a *large* globular receptacle of brass into which a suffi-

cient quantity of soft iron chain could be put, for the purpose of this compensation: I believe it would answer better than cast iron. To suppose, as I have seen it stated, that it would want tons of that metal for the correction, is simply an absurdity.

Reverting to the compensation, by bar-magnets placed parallel with the deck, of the semicircular deviation represented by the coefficients B and C, it will be seen, from Figs. 34, 35, 36, and 37, that in each case the correcting magnet trends in the direction of the line of force, *i.e.*, of the magnetic meridian, as it passed through the ship at the time she was on the stocks; hence for ships built N. and S. the magnet naturally lies fore-and-aft, and for ships built E. and W. it lies athwartship, since the line of force would at the time trend athwartship. But a ship built in the direction of any of the intercardinal points would have the line of force making an oblique angle with the keel. Now, though two magnets, laid in different directions, one fore-and-aft, and the other athwartship, are used to correct B and C, nevertheless a single magnet, so placed that it shall make the same oblique angle with the keel that did the line of force while the ship was building, would be sufficient for the purpose of correcting the deviation due to the ship's sub-permanent magnetism. The respective values of B and C, *plus* and *minus*, are the data whence are derived the angle of direction for the magnet, and the total force to be corrected; thus,

$\sqrt{B^2 + C^2}$ = the maximum semicircular deviation; and

$\tan a = \frac{C}{B}$ = the angular direction of the magnet with the keel;

and these, having due regard to the signs of the co-efficients, indicate whether the magnet that is placed horizontally beneath the compass, and at an oblique angle with the keel, must have its N.-marked (*red*) pole forward or aft, to starboard or port.

But the ordinary Traverse Table suffices for the computation. Suppose $+$ B 23°·6 and $-$ C 11°; then, with 23·6 in Lat. column, and 11 in Dep. column, we get in the Dist. column 26° as the semicircular deviation to be corrected, and the course of 25° is the angle that the magnet should make with the direction of the keel, the N-marked (*red*) pole pointing to the port bow.

The part of the ship towards which the *red* pole of the correcting magnet should be directed may be briefly given as follows :—for,

+ B and − C to port bow;
+ B and + C to starboard bow;
− B and − C to port quarter;
− B and + C to starboard quarter.

I have already told you, on p. 805, of the extent to which the co-efficients B and C change on change of magnetic latitude and geographical position; the placing of magnets to adjust the compass only slightly interferes with, and retards, this change; but magnets and soft iron undoubtedly improve the directive force of the compass needles when, from a bad position, that is defective. You must also remember that on altering a course from one direction to another there is a temporary deviation such that the new course errs in the direction of the course left.

To compensate the heeling error, when the attraction of the N. end of the needle is to the weather or high side in the Northern hemisphere, a magnet must be placed vertically and exactly under the centre of the compass, with the N.-marked (*red*) pole uppermost; but it would require to be lowered as the magnetic equator was approached, and removed on proceeding into the other hemisphere, where it would probably not be wanted. For a large heeling error to leeward in the Southern hemisphere the N-marked pole of the magnet must be placed downwards. The effect in any case would have to be carefully watched, because, of the sources out of which the total error arises, only one remains permanent; of the two others, one decreases and increases with decrease and increase of latitude, and the third changes its name in opposite hemispheres.

The compass of a steamer given to rolling is as liable to heeling error as is one in a sailing ship; the result is also unsteadiness, and inaccuracy of indication. A list from shifting of cargo would also give a heeling error.

There are those who may say that much of what has here been written is more theoretical than practical. As a matter of fact it partakes of both characters, and is essentially practical, provided always that the compass, as an instrument of navigation, is worthy

of the name, and is placed in a tolerably good position. But a heavy compass card, from ten to fourteen inches in diameter, with needles of the same length and with directive force scarcely sufficient for the weight, has no part in what I have written. This paper being intended as a series of simple lessons on the magnetism of an iron ship I have avoided all reference to various specialities and idiosyncracies, and to the ignorance that still prevails in respect to magnetism and the compass: these I reserve for future comment, when opportunity offers.

My closing advice is:—Constantly watch your compass; make frequent observations, by day and night if possible, to detect errors as they arise; for which purpose provide yourself with a dumb card and a book of "Time Azimuths." W. H. R.

CORRECTION OF CHARTS.

THE following letter has been written by Commander Thomas A. Hull, the late Superintendent of Admiralty Charts, to the managers of some of the principal steamship companies, in which he places his experience and services at their disposal as examiner and corrector of the Admiralty Charts in use on board their vessels.

There is unquestionably much scope for such services as those offered by Commander Hull. Shipowners and shipmasters will in many cases find it economical to have their charts corrected as proposed, and it certainly will tend to the safety of navigation. We are glad to bring Commander Hull's proposition before our readers, and to congratulate him on having already obtained substantial support from some well-known steamship companies and encouragement from influential and experienced officers.—Ed. N. M.

"Noowook, Wimbledon, 21st October, 1880.

"Sir,—Having frequently observed that the charts in use on board vessels of the Mercantile Marine, although the best obtainable when originally supplied, still, from not being corrected up to date for changes that are constantly occurring, are often considerably in error, I would therefore, in the interests of English shipping, venture

to ask, whether your Company would be inclined to insure the future efficiency of the charts in use on board their steamers, by having them examined, each voyage, before a steamer leaves England.

"Should your Company look favourably on this proposition, I beg, as an officer of thirty-five years' experience in the Surveying Service of the Royal Navy and for the last six years Superintendent of Admiralty Charts, to place my services at your disposal, and to make the following proposals.

"That I should be allowed to examine the Admiralty Charts and books of Sailing Directions now in use on board your steamers, and then furnish them with a list of new charts and books that would require to be purchased, to place the set on a correct footing.

"After a vessel's charts have thus been recruited, I would undertake in most cases to keep them corrected up to date by hand, the exceptions being where the additions or corrections made were so large, that the Admiralty have cancelled the charts in question, in which cases your Company would have to purchase new charts.

"I would advise your Company of all new charts and sailing directions that may be published, and otherwise use my best endeavours to insure your ships leaving port as efficiently provided with charts and sailing directions as are the vessels of Her Majesty's Navy. The expense would, I anticipate, be small after the first outlay of bringing each ship's folio of charts up to date.

"The remuneration required for the above examination of charts would be one guinea for each ship visited prior to her leaving England.

"I am, Sir, your obedient servant, THOMAS A. HULL,

"Commander, late Master and Pilot, R.N.

"To the Manager of the Steamship Company.

"P.S.—On three steamships whose charts I have been permitted to examine, I found as follows:—

"On steamship	A,	out of	104	charts,	95	required renewal,
,,	B,	,,	49	,,	39	,,
,,	C,	,,	93	,,	73	,,

"T. A. H."

TRINITY HOUSE SYSTEM OF BUOYAGE FOR MARKING CHANNELS, &c.

APPROVED BY THE ADMIRALTY AND THE BOARD OF TRADE.

[The system of marking channels by buoys adopted by the Trinity House is not so generally known as it should be. It has been in operation for many years, and is sufficiently effective for its purpose. The following is the text of the rules as published by the Trinity House, but thinking that it would facilitate masters, officers, pilots, and apprentices in committing the rules to memory if they were put into easy rhyme (the success of Mr. Thomas Gray's rhymes on the Rules of the Road encouraging the idea), we publish the buoyage rules in verse, and hope they may be found useful.—Ed. *N. M.*]

THE side of the Channel is to be considered Starboard, or Port, with reference to the entrance to any Port from Seaward, or in accordance with the course of the flood tide.

The entrances of Channels, or turning points, shall be marked by Conical Buoys with or without Staff and Globe, or Triangle, Cage, &c.

Single-coloured Can Buoys, either Black or Red, will mark the Starboard side, and Buoys of the same shape and color, either chequered or Vertically striped with White, will mark the Port side: further distinction will be given when required by the use of Conical Buoys, with or without Staff and Globe, or Cage: Globes being on the Starboard hand and Cages on the Port hand.

Where a Middle Ground exists in a Channel, each end of it will be marked by a Buoy of the colour in use in that Channel, but with Annular Bands of White, and with or without Staff and Diamond or Triangle, as may be desirable: in case of its being of such extent as to require intermediate Buoys, they will be colored as if on the sides of a Channel. When required, the outer Buoy will be marked by a Staff and Diamond, and the inner one by a Staff and Triangle.

Wrecks will still continue to be marked by Green Nun Buoys.

TRINITY HOUSE BUOYAGE SYSTEM.

TO PILOTS AND OTHERS.

Sides of Channels.

The port or starboard side
Of channels, strait or wide,
Is clearly shown and may be known,
As runs the flowing tide.

Each channel is defined,
Or rather each side lined
With buoys to tell, how you may well
The safest passage find.

Colours of Buoys.
Starboard.

Now you must understand,
That on the starboard hand,
Buoys red or black, define the track
And warn you of the sand.

Port.

But port buoys when in sight,
Will show plain marks of white,
In stripes or squares, with equal shares
Of red or black and white.

Globes & Cages.

The buoys above pourtrayed,
Are also sometimes made
With globe or cage, above the stage,
To render further aid.

But you must always know
That globes are used to show
The starboard side, while port buoys ride
With cages in a row.

Middle Grounds.

Each end of middle sands,
You'll find a buoy with bands,
Of red and white or black and white,
Supplying all demands.

For middle buoys that ride
At ends of dangers wide,
A diamond frame for seaward claim,
A triangle inside.

Wrecks.

Nun buoys for marking wrecks
Suggest the female sex,
Their colour green, may well be seen
From any vessel's decks.

E. P. E.

November, 1880.

NOTES FROM CONSULAR REPORTS.

BRAZIL.

Maceio.—During the year ending March last, 85 vessels, with a total of 56,917 tons, visited this port, 59 being British and 26 Foreign.

Cotton and sugar appear to be the chief commodities exported, but during the last five years the produce of the former has gradually declined, although the Vice-Consul reports that the cotton factory has extended its business. The financial condition of the sugar planters appears to be unsatisfactory, and the Provincial Government are making efforts to introduce an improved system of sugar manufacture, with a view of assisting the planters and of improving the quality of the sugar which has deteriorated in consequence of the many difficulties attending a primitive and unsatisfactory manner of working the sugar estates. The sanitary condition of the port is said to be much improved.

Paraiba.—The shipping season of 1879-80 commenced with better prices for sugars, and a more remunerative rate was also obtainable for cotton. The yield of both commodities promises to be better for this year. Some small experimental shipments, Pernambuco, have been made of the india-rubber obtained from Mangaba tree. A small parcel was sold at Liverpool for

1s. 6d. per pound, and the report as to its quality was favourable, but the peasants have not yet learnt the proper method of preparing it for market. This of course will be remedied as the trade developes, and as the supply is almost unlimited there is no reason why india-rubber should not become one of the staple articles of export.

The finances of the province are in a very unsatisfactory state, to remedy which import duties have been established. A serious falling off in the exports of sugar and cotton is noticeable in the years 1878 and 1879 as compared with previous years.

Rio Grande do Norte.—Trade during the year 1879 showed a considerable improvement, though the prosperity of the province is still seriously affected by the continued droughts. Sugar is the staple commodity, and the Provincial Government are assisting the planters by the establishment of large central factories. The extraction of india-rubber from the Mangaba and Minnisoba trees is being developed with promise of success.

Santos.—The commercial activity of this port is reported to have increased five-fold within the last few years. Coffee is the staple product, the production of sugar having been entirely abandoned, and that of cotton being sufficient only to supply the wants of rural labourers.

Imports are said to amount to about £1,500,000, nearly one-third being supplied from Great Britain in the shape of hardware, railway stock, coal, cutlery, dry goods, &c. The railway development of the province is proceeding rapidly. Sao Paulo, with which Santos is connected by rail, is a large and flourishing city, and promises to become the largest town in Brazil. It now has a population of 35,000.

It is probable that the port of Santos will be before long much improved in anticipation of the further development of trade. The town is not, however, very healthy, and the yellow fever season usually commences about the 1st February and lasts until the end of April, during which period it is advised that British ships should avoid Santos.

During the year from 1st July, 1878, to June 30th, 1879, the total number of vessels entering the port was 480, with a total of

328,342 tons, 303 vessels being engaged in foreign, and 177 in coasting trade. The total value of imports was £2,009,322, and of exports £3,259,511. There appears to be every promise that the 1880 season will be a prosperous one, but labour is scarce and much of the coffee crop is in consequence liable to be wasted.

CHILE.

Caldera.—The chief exports from this port are gold, silver, and copper, nitrate of soda, and borax. The returns for 1879 show a decrease as compared with previous years. The value of the imports exceeded by half-a-million of dollars that of the exports.

The return of British and foreign shipping visiting the port in 1879 shows a considerable falling off in the shipping of all nations, but especially in that of British sailing vessels, of which 40 to 50 used annually to visit the port, while last year only 16 entered. The war is, of course, the principal reason why shipping trade has suffered. There is no bulky export cargo for sailing ships as formerly, when the crude copper and silver ores were sent away to Europe. Now that they are smelted on the spot, the pure metals can always afford to pay the superior freight of steamships. It appears that want of capital, engineering knowledge, and good machinery has operated to prevent the mines from being properly developed.

A new port is being opened up at Taltal, from which large quantities of nitrate of soda can be shipped, the port being quite close to vast fields of this mineral. There is a good and safe harbour, easy of entrance and exit for sailing vessels, and now a port of call for almost all the coasting steamers.

Coquimbo.—For the year 1879 the shipping trade at this port appears to have fallen off somewhat, probably owing in great measure to the war between Chili and Peru. There was not, however, any falling off in the chief branch of industry of the province, viz., copper mining and smelting, there having been an export of 900 tons of bar copper more than in the previous year. ...ne of the mines of the district are giving good results, but ... is a want of machinery, not only for obtaining good copper

ore, but also for working a district, over which, it is said, a large quantity of gold exists. Some parts of the province are being cultivated with success, the farmers now giving more attention to growing cereals than hitherto. There is also something done in rearing and fattening cattle.

As regards an import trade, the Consul observes that if manufacturers at home were speculative and forwarded their goods to respectable merchants, to be sold on commission, they would be more successful in making sales, and trade would be extended. Thrashing and reaping machinery and other articles for agricultural and dairy use, and also machinery for mines, are those principally required.

The port of Coquimbo is one of the finest in South America, and there is always fine weather. The excellence of the harbour, protected from all winds, and usually as calm as a millpond, would render it a most suitable station for a floating dock, and it is not improbable that private enterprise may ere long be directed to this object. Now that Coquimbo has become the British Naval Station on the West Coast a floating dock would be a most desirable acquisition.

COSTA RICA.

San José.—Coffee is the principal export from the port of Punta Arenas, but owing to difficulties of transport to the port a great portion of the crop cannot be brought down for shipment. It is hoped that as soon as the railway on the Atlantic side comes within twenty-five miles of the capital it will facilitate exportation and induce agriculturists to cultivate other produce.

The number of vessels visiting the port of Punta Arenas is not large, but no falling off is apparent. At the port of Limon a marked increase is discernible, the Royal Mail steamers call monthly, and recently some of the West India and Pacific Company's vessels have also visited the port. The development of commerce at Limon seems to have been very extensive. The harbour is safe in all weathers with 15 to 40 feet of water, and excellent anchorage.

The prospect of a good coffee crop this year encourages the hope that the commerce of Costa Rica will improve.

TAHITI AND SOCIETY ISLANDS.

Tahiti.—The direct trade between Great Britain and these islands appears to be decreasing, and indeed the total tonnage of vessels visiting Tahiti in 1879 is much less than that of previous years. Cotton, coprale, pearl shells, and oranges seem to be the most important of the exports. Imports are generally subject to a duty termed *Octroi de mer* at the rate of 12 per cent. *ad valorem*, but machines for agricultural purposes, or for working wood or metals, with some other articles, are duty free. There are also pilotage and light dues levied at the port of Papeete.

The Society or Leeward Islands are said to possess very good harbours, but the trade appears to be entirely with the Tahitians.

MOROCCO.

Tangier.—The shipping returns for 1879 show a considerable increase in the number and tonnage of vessels entering the port of Tangier as compared with the year preceding. Both French and Spanish trades seem to have made a vigorous attempt to secure a greater portion of the carrying trade than had hitherto fallen to their share, and there is rather a keen competition which is probably even now lowering the freights.

The general trade of Morocco appears to have improved, although many of the peasants are still suffering from the effects of the two years of drought and famine previously to 1878. The chief imports appear to be cotton goods, flour, raw silk, tea, and sugar, in the first of which Great Britain has by far the largest share, but in regard to the other commodities we are beaten by France.

The exports consist of oxen, eggs, slippers, meat, hides, dates, &c., to Great Britain, France, and Spain, the total value of the exports to the two latter countries being rather more than half that of the goods shipped to Great Britain.

The prospect of an abundant harvest throughout Morocco this year is referred to as likely to raise the country from the misery and poverty which has prevailed during the last three years.

(*To be continued.*)

NAUTICAL ASSESSORS.

WE observe that an attempt has been made to disturb the arrangements so carefully made by Lord Sandon in reference to the appointment of assessors in shipping casualties investigations. In the case of a Mercantile Marine master or officer being on his trial, it is quite reasonable to suppose, and fair to believe, that those who assist the judge with their nautical experience should have a practical knowledge of the conditions of duty under which the accused was acting or supposed to be acting when the casualty occurred. We certainly sympathised with the action taken last year, by which it was urged upon Lord Sandon that merchant captains were more capable of judging of the acts or defaults of their brother masters in connection with marine casualties than Royal Naval officers, whose experience on board men-of-war is, in a general way, widely different from that of an officer in the Mercantile Marine. We never hear that merchant captains are called upon to assist in the courts martial which follow casualties to H.M. ships. It is sufficient to put this converse aspect of the case, to show how reasonable is the view that in Mercantile Marine inquiries merchant captains should be preferred as assessors to Royal Naval officers. The principle acted upon in ordinary courts of law is that a man shall be tried by his peers. This is a wholesome principle which commends itself to British instinct, and deserves to be extended in any direction in which it can be legitimately applied.

A Parliamentary paper recently issued, indicates that Lord Sandon's settlement of the matter does not give general satisfaction, more especially to those gentlemen who, as officers of the Royal Navy, had acted as nautical assessors. From this Parliamentary paper we find that Lloyd's Committee (who, by the way, appear easily induced to espouse a cause without much inquiry into its merits) are much concerned at the prospect of the diminished employment of naval men in the investigations, and call upon the Board of Trade to make alterations with a view to "the frequent employment of officers of the Royal Navy."

Following this simple effusion is the letter which appears to be the *Deus ex machinâ* of the whole business. It is signed by one Vice-Admiral, two Rear-Admirals, and two Captains, R.N., and is addressed to the Board of Trade. The ostensible object of the letter is to refute certain allegations said to have been made respecting naval officers, but really the chief point is unquestionably contained in their reference to "the almost practical exclusion of naval officers from these inquiries," a reference which seems to suggest that these gentlemen have a vested interest in the assessorships, and that Parliament in an unguarded moment had, by putting some restriction on their too frequent employment, infringed one of the rights of property. Such a view is of course too absurd to be seriously entertained, and it certainly appears to be unnecessary to remind these naval officers that the Courts of Inquiry were not established simply for their benefit. The numerous letters appended to this communication purport to be "opinions" on the subject, and among the writers are the Wreck Commissioner, five Stipendiary Magistrates, and numerous Justices of the Peace. To our thinking by far the most sensible of the communications are from gentlemen who say they do not think it proper to express an opinion on the matter; several of the writers have evidently not formed a clear idea as to the significance of the questions which have been put to them; but the majority of the letters appear to be simply testimonials of past good behaviour on the part of the naval officers, without furnishing any reasons why their services should be regarded as specially appropriate or necessary at Courts of Inquiry.

The letter of the Wreck Commissioner stands out from the rest as exceptional in the vigour of its advocacy of the cause of the naval officers, and its condemnation of Lord Sandon's Act, the latter being characterised as "one of the greatest blows that has ever been aimed at the independency and efficiency of these Courts." The invidious comparison suggested by the Wreck Commissioner's remarks is, we fear, only too likely to re-awaken the angry feeling which found vent last year among mercantile shipmasters, and which Lord Sandon's Act did so much to pacify, and it will hardly be surprising if some unpleasant rejoinders are

made. It is the nemesis of too ardent advocacy that opponents are apt to make imputations and statements of a damaging nature, and the Wreck Commissioner must be prepared to hear the views of the other side strongly expressed and we fear in a manner not altogether agreeable.

Having the highest respect for the Wreck Commissioner and for the admirable manner in which he deals with the cases brought before him, we venture to remonstrate with him upon the tone of his letter, and to respectfully remind him that as we do not for a moment suppose he desires to insinuate that experienced merchant captains are incompetent to act as nautical assessors, the cause he so strenuously supports is only in the interest of a few naval officers who wish to be more frequently employed on these inquiries, while on the other hand there are the class interests of the whole Mercantile Marine, which the intelligent members of the profession will not fail to guard most jealously. The arrangement now in force commends itself to the good sense of all impartial minds. There is no objection to a naval officer assisting the judge in certain cases where his services may be of special value, but this agitation to give naval officers the priority or even equality of employment will be regarded as being unreasonable and unfair to the merchant service, and certainly not what might have been expected to emanate from such officers themselves.

Since the above was in type we have received the following communication on the subject to which we gladly give insertion:—

To the Editor of the "Nautical Magazine."

SIR,—The Shipping Casualties Investigations Act, 1879, appears to be a notable instance of the difficulty of pleasing everyone.

Those provisions in it which abolished the previous vicious system of selection of nautical assessors, established rules intended to secure the appointment of shipmasters of experience to those posts, did away with the quasi-criminal character which the inquiries were supposed to bear, and established a mode of appeal from the decisions of the Court, all gave great and general satisfaction.

It seems, however, that there is yet a class of objectors loudly protesting against its operation, so far as it affects their particular interests.

The nautical assessors chosen from the Royal Navy, although in number not exceeding half-a-dozen, have, by making the question a class one, contrived to raise no inconsiderable outcry, and a Parliamentary Return has been lately published on the subject, containing for the most part a long list of letters from the Wreck Commissioner and various magistrates more or less laudatory of the Royal Naval element.

The curious part of these documents is that the one qualification which has heretofore been held to be the *raison d'être* of Royal Naval assessors at all is stated distinctly not to be preserved by them.

When it was proposed to have none but nautical assessors selected from the Merchant Service, Lord Sandon and others described such an arrangement as too much like a family affair, and urged that the presence of a Royal Naval officer on an Inquiry would, in the interest of the public, check the tendency of mercantile assessors to be too lenient to the shortcomings of their fellow shipmasters. It is now adduced that on the contrary, Royal Naval officers are exceptionally lenient, and if so, it would appear that the public interest is not represented by them.

In reality, however, the objection to Royal Naval assessors is not based on their leniency or otherwise, but solely because as at present selected these officers for the most part have scarcely any acquaintance with the subject on which they are called to advise the judge, and it is difficult to see what is the value of the testimonials on this head, from the very persons who presumably themselves require to be instructed on the subject.

There is no desire on the part of shipmasters generally to exclude the naval element from the inquiries, but it is felt that, if it is to be introduced, the assessors should be selected from that branch of the Royal Navy which has some experience in matters which are common to both the Royal and Merchant rvices, viz., staff commanders or officers who have been engaged the surveying service.

There are four heads under which shipping casualties for the most part occur. First, from faulty navigation; second, from improper stowage of cargo; third, from unseamanlike conduct in handling of the vessel; and fourth, from faulty condition of hull, engines, or apparel. Now, on not one of these heads is an officer who has served exclusively in the combatant branch of the Royal Navy, likely to possess any but a very superficial knowledge.

On a Naval Court-Martial, if it is a question of navigation, the Admirals and captains forming the Court do not trust themselves to decide on it without having called in a navigating officer or staff commander to advise them on the subject.

Stowage of cargo is a matter which never comes before the notice of naval officers in any shape throughout the whole of their career.

The handling of men-of-war in narrow waters, or when going into or out of port, is executed by the staff commanders, who are the pilots of the ships.

Any question of discipline or manœuvring is so totally different in a merchant ship, with scarcely hands enough to man one brace at a time, and a man-of-war, with ten times the number in crew that the naval officer accustomed to the latter is utterly unable to realise the position of the shipmaster in the former.

And, lastly, for the condition of the hull, engines, or apparel, the captain of a man-of-war is totally dependent on the dockyard authorities, or on his subordinate warrant officers.

Throughout the whole of the correspondence published in the Return under consideration, there is not one word suggesting that the Courts of Inquiry have suffered in efficiency from the operation of the Act of 1879, with one exception, that of Mr. Rothery, the Wreck Commissioner. It may be that the statement at the conclusion of his letter that the Act is "one of the greatest blows that has been aimed at the independency and efficiency of the Courts," is merely a rhetorical flourish with which to wind up a somewhat diffuse letter. But if it is more than this, what does it mean? Is Mr. Rothery now left independent of his assessors since the new Rules came in force, and has his Court been thereby rendered less efficient?

That the present system is not perfect may be readily admitted, but whatever further change is to be made, it is devoutly hoped by all who understand the nature of the Merchant Service of this country, that it will be in the direction of the employment as Royal Naval assessors of staff commanders only. The Courts must be content to dispense with the dignity conferred on them by distinguished assessors of high rank, and must put up with men whose advice is likely to be of some practical value, and not misleading.

Yours, &c.,

A BRITISH SHIPMASTER.

CORRESPONDENCE.

WILMINGTON OR SAN PEDRO.

To the Editor of the "Nautical Magazine."

DEAR SIR,—On a recent voyage to Wilmington, or San Pedro, in Lower California, I found that the published sailing directions were quite inadequate as a guide, and having while there jotted down some notes about the place, I thought that if you inserted them in your valuable Magazine they might prove of use to some other shipmasters.

I remain, dear Sir, your obedient servant,

E. J. MOLONY,

Ship *British Merchant.*

Liverpool, November 1, 1880.

Vessels bound to San Pedro may either pass through the Santa Barbara Channel or outside the Islands.

The former course is, on the whole, preferable, especially in the summer season, when the prevalent north-west winds blow home along the coast.

The Channel is at all times more free from fogs than the space ween and around the islands, and as the coast is bold, well

lighted, and free from outlying dangers, the passage is a safe one. In the autumn and winter months the north-west winds do not blow in the Channel, calms and light airs from the southward being common; then a vessel can take the outside route, passing to the northward of Catalina Island.

On approaching this part of the coast it is easily distinguished by the high hill of San Pedro, which forms a promontory protecting the roadstead from the prevalent northerly winds. At the south-east corner of this promontory, Point Firmin, a lighthouse has been constructed, which shows a red and white flashing light, visible 20 miles. This point may be rounded by large vessels at the distance of a mile, and then steering for Deadman's Island (or El Moro) preserve this distance from the bluff until the light bears S.W., when the anchor may be let go in 6 fathoms. It is not advisable for a large vessel to anchor closer in; small vessels, or steamers of light draught, can anchor within half a mile of the beach in 4 fathoms, or even cross the bar at high water, and anchor abreast of the village of San Pedro; but this should only be attempted in vessels drawing less than 15 ft., and with some local assistance.

In the roads the bottom is sandy ooze, and good holding ground; but there are large patches of rock, generally shown by the kelp, which sometimes grows in 20 or 30 fathoms of water, but always over a foul bottom. This must be by all means avoided, and in coming to an anchor sufficient space, clear of kelp, must be allowed around the ship to permit lighters to come alongside with facility.

As the roadstead is open to all winds between S.E. and S.W., vessels lying here in the winter months (November to March) should be prepared to slip in the event of a south-easter springing up. The residents at Wilmington assert that a vessel well found with ground tackle can ride out any of the winter gales, but doing so would be attended with a great amount of risk, as the place is quite open.

Vessels discharge their cargoes into large lighters, which carry from one hundred to two hundred tons, and are towed to and from Wilmington by a steamer. Ships having a steam winch

can discharge with great facility, as empty lighters are constantly in attendance, and the water, owing to outlying beds of kelp, is perfectly smooth. Extra hands, or a steam winch for working cargo, can be hired at Wilmington. Supplies of all sorts are good, and very cheap.

The harbour of Wilmington is an extensive shallow inlet, the entrance to which has been increased to a depth of 17 ft. at high water by a breakwater, as yet incomplete; but the extent of deep water inside the bar is limited, at present only sufficient for a few coasting vessels. The Channel from the entrance to the town, three miles above, is shallow and intricate, winding between extensive mud flats, dry at low water; it is only used by a few small steamers and the smallest class of coasters.

At Wilmington the Southern Pacific Railway Company have a large wharf and depôt, and here goods and passengers are embarked for the coasting steamers, which call here twice a-week on their way from San Francisco to San Diego.

It is twenty-one miles by rail from Wilmington to the county capital, Los Angelos, the line passing through a rich and populous agricultural country. Los Angelos is a flourishing business town, with a rapidly increasing trade, both through Wilmington and by rail with the northern and inland parts of the state.

If the bar is deepened to admit large vessels (as is proposed), Wilmington must become an important seaport, and at present it has the advantage of being incomparably the cheapest place on the Pacific Coast.

E. J. M.

Rockets and Shells.—The following bye-law has been made by the Conservators of the River Thames in exercise of the powers and authority vested in them by "The Explosives Act, 1875," and it has been sanctioned by the Board of Trade. "No rockets or shells shall be fired off on the River above or westward of the Lower Hope Point, provided always that emigrant and passenger ships may test the efficiency of their signals of distress in Gravesend Reach under the supervision of the officers of the Board of Trade."

TIDE TABLES FOR DECEMBER, 1880.

Also Ports of Reference for the Constants in the next Table.

Week Day.	Month Day.	London Bridge.		Hull.		North Shields		Leith.		Devon-port.		Dover.		Weston-super-Mare.		Liver-pool.		Green-ock.		Queens-town.		Kings-town.		London-derry.		Brest.	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
		H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
W	1	0 30	0 55	5 5	5 29	2 4	2 27	1 1	1 25	4 18	4 43	9 49	10 15	5 30	5 57	10 2	10 26	10 46	11 12	3 40	4 5	9 57	10 20	6 44	7 9	2 28	2 52
Th	2	1 20	1 43	5 53	6 18	2 50	3 13	1 48	2 11	5 8	5 33	10 42	11 9	6 24	6 50	10 51	11 16	11 38	—	4 30	4 56	10 42	11 5	7 34	7 57	3 16	3 40
F	3	2 7	2 31	6 43	7 8	3 37	4 2	2 34	2 58	5 58	6 23	11 36	—	7 16	7 41	11 41	—	0 4	0 30	5 22	5 48	11 29	11 54	8 20	8 43	4 4	4 28
S	4	2 57	3 21	7 33	7 58	4 27	4 52	3 22	3 47	6 48	7 12	0 3	0 30	8 5	8 29	0 6	0 31	0 56	1 21	6 13	6 38	—	0 20	9 6	9 30	4 53	5 18
𝔖	5	3 45	4 11	8 23	8 49	5 17	5 43	4 12	4 38	7 36	8 0	0 57	1 24	8 53	9 16	0 56	1 21	1 46	2 11	7 3	7 28	0 46	1 13	9 54	10 19	5 43	6 9
M	6	4 36	5 2	9 15	9 41	6 9	6 36	5 5	5 32	8 24	8 49	1 51	2 17	9 38	10 0	1 46	2 11	2 36	3 1	7 53	8 17	1 40	2 7	10 45	11 14	6 35	7 1
Tu	7	5 26	5 52	10 7	10 34	7 3	7 31	6 0	6 28	9 14	9 39	2 43	3 9	10 21	10 42	2 36	3 1	3 26	3 51	8 41	9 5	2 34	3 1	11 47	—	7 27	7 53
W	8	6 18	6 45	11 3	11 35	8 1	8 32	6 57	7 27	10 4	10 30	3 34	3 58	11 3	11 28	3 26	3 53	4 16	4 41	9 29	9 53	3 28	3 57	0 22	0 59	8 20	8 48
Th	9	7 13	7 42	—	0 7	9 5	9 39	7 59	8 32	10 57	11 26	4 22	4 48	11 57	—	4 23	4 56	5 8	5 37	10 21	10 53	4 28	5 0	1 37	2 15	9 17	9 49
F	10	8 12	8 43	0 39	1 11	10 13	10 47	9 6	9 41	11 58	—	5 16	5 46	0 28	1 1	5 31	6 9	6 8	6 42	11 27	—	5 32	6 4	2 50	3 23	10 25	11 1
S	11	9 20	9 55	1 43	2 15	11 20	11 52	10 14	10 45	0 34	1 9	6 17	6 50	1 36	2 11	6 45	7 19	7 16	7 50	0 1	0 35	6 35	7 6	3 52	4 20	11 37	—
𝔖	12	10 28	11 1	2 46	3 16	—	0 22	11 15	11 43	1 43	2 16	7 24	7 56	2 46	3 21	7 51	8 21	8 23	8 54	1 10	1 44	7 36	8 6	4 45	5 8	0 11	0 41
M	13	11 31	—	3 46	4 14	0 49	1 15	—	0 9	2 45	3 13	8 25	8 51	3 54	4 25	8 48	9 12	9 23	9 49	2 14	2 41	8 35	9 2	5 30	5 52	1 10	1 36
Tu	14	0 1	0 28	4 39	5 1	1 38	2 0	0 32	0 54	3 39	4 4	9 16	9 40	4 53	5 19	9 34	9 55	10 14	10 37	3 7	3 31	9 27	9 50	6 14	6 36	1 59	2 21
W	15	0 52	1 13	5 23	5 44	2 21	2 41	1 16	1 37	4 28	4 50	10 3	10 25	5 43	6 6	10 15	10 35	10 59	11 21	3 53	4 14	10 10	10 28	6 58	7 19	2 41	3 1
Th	16	1 36	1 55	6 4	6 24	3 0	3 18	1 57	2 16	5 11	5 31	10 46	11 6	6 28	6 48	10 55	11 14	11 42	—	4 35	4 54	10 46	11 4	7 39	7 57	3 20	3 39
F	17	2 12	2 30	6 43	7 1	3 36	3 54	2 34	2 51	5 50	6 8	11 26	11 46	7 7	7 26	11 33	11 51	0 2	0 21	5 13	5 32	11 22	11 40	8 14	8 30	3 57	4 15
S	18	2 47	3 4	7 19	7 37	4 12	4 30	3 7	3 24	6 26	6 43	—	0 5	7 44	8 1	—	0 9	0 40	0 59	5 50	6 8	11 58	—	8 46	9 2	4 33	4 50
𝔖	19	3 23	3 42	7 55	8 11	4 47	5 4	3 41	3 58	6 58	7 13	0 24	0 42	8 17	8 33	0 27	0 44	1 17	1 33	6 25	6 41	0 15	0 32	9 18	9 33	5 7	5 23
M	20	3 58	4 14	8 27	8 44	5 21	5 38	4 15	4 32	7 29	7 45	1 0	1 18	8 49	9 5	1 0	1 16	1 49	2 5	6 58	7 15	0 49	1 7	9 48	10 4	5 39	5 56
Tu	21	4 31	4 48	9 1	9 20	5 56	6 15	4 50	5 10	8 1	8 17	1 36	1 55	9 21	9 37	1 33	1 51	2 22	2 40	7 33	7 51	1 25	1 44	10 22	10 42	6 14	6 32
W	22	5 6	5 23	9 39	9 58	6 35	6 55	5 30	5 51	8 33	8 49	2 14	2 33	9 52	10 8	2 9	2 27	2 58	3 16	8 9	8 27	2 4	2 24	11 4	11 28	6 51	7 11
Th	23	5 42	6 2	10 18	10 39	7 15	7 37	6 12	6 34	9 8	9 29	2 53	3 13	10 24	10 41	2 46	3 6	3 35	3 55	8 46	9 5	2 45	3 6	11 54	—	7 32	7 53
F	24	6 22	6 45	11 3	11 30	8 1	8 27	6 57	7 22	9 51	10 14	3 33	3 53	11 0	11 21	3 26	3 48	4 15	4 37	9 25	9 46	3 28	3 52	0 23	0 53	8 15	8 39
S	25	7 8	7 35	11 59	—	8 55	9 26	7 49	8 20	10 40	11 9	4 15	4 39	11 47	—	4 14	4 44	5 0	5 27	10 11	10 42	4 19	4 50	1 26	2 2	9 6	9 38
𝔖	26	8 2	8 33	0 30	1 1	10 0	10 35	8 54	9 29	11 42	—	5 6	5 36	0 17	0 49	5 18	5 55	5 58	6 30	11 16	11 52	5 22	5 54	2 38	3 12	10 12	10 50
M	27	9 7	9 45	1 33	2 6	11 10	11 45	10 4	10 38	0 19	0 59	6 8	6 42	1 25	2 3	6 34	7 11	7 5	7 41	—	0 28	6 26	6 59	3 45	4 15	11 28	—
Tu	28	10 21	10 54	2 39	3 12	—	0 19	11 12	11 43	1 37	2 13	7 19	7 55	2 41	3 19	7 47	8 21	8 17	8 52	1 5	1 42	7 32	8 5	4 43	5 9	0 6	0 40
W	29	11 29	—	3 45	4 16	0 49	1 18	—	0 12	2 48	3 22	8 29	9 0	3 57	4 33	8 51	9 19	9 26	9 56	2 17	2 49	8 38	9 9	5 35	6 0	1 13	1 43
Th	30	0 2	0 33	4 45	5 12	1 45	2 12	0 39	1 6	3 54	4 25	9 29	9 58	5 7	5 39	9 46	10 13	10 26	10 56	3 20	3 49	9 39	10 7	6 26	6 54	2 11	2 38
F	31	1 1	1 29	5 39	6 6	2 38	3 3	1 33	2 0	4 54	5 22	10 27	10 56	6 10	6 39	10 40	11 6	11 25	11 53	4 17	4 45	10 31	10 55	7 22	7 49	3 4	3 30

TIDAL CONSTANTS

For Various British, Irish, and European Ports.

By applying the Tidal Constant of the place, according to its sign (+ *add.* − *sub.*), to the time of high water on the given day at the port of reference, you have the time of high water at the place sought.

Place.	Constant. H. M.	Port of Reference.
Aberdeen	−1 17	Leith
Aberystwyth	−3 52	Liverpool
Alderney	+2 59	Brest
Antwerp	+5 13	Dover
Arbroath	−0 42	Leith
Arcachon	+0 50	Brest
Arklow	−2 25	Kingstown
Ayr	−0 18	Greenock
Banff	−1 49	Leith
Bantry harbour	−1 14	Queenstown
Barnstaple bridge	−0 26	Weston-s.-Mare
Bayonne	−0 2	Brest
Beachy head & Rye bay	+0 8	Dover
Beaumaris	−0 51	Liverpool
Belfast	+2 42	Londonderry
Berwick	−1 5	N. Shields
Blyth	−0 8	N. Shields
Bordeaux	+3 3	Brest
Boulogne	+0 13	Dover
Bridport	+0 22	Devonport
Bristol & King Road	+0 19	Weston-s.-Mare
Cadiz	−2 2	Brest
Caernarvon	−1 56	Liverpool
Calais	+0 37	Dover
Campbellton	−0 23	Greenock
Cardiff	+0 2	Weston-s.-Mare
Cardigan bar	−4 22	Liverpool
Carlingford bar	−0 10	Kingstown
Chatham	−0 47	London
Cherbourg	+4 2	Brest
Coleraine	−1 37	Londonderry
Coquet Road	−0 23	N. Shields
Cordouan Tower	−0 10	Brest
Cowes (West)	−0 27	Dover
Crinan	+4 41	Greenock
Cromarty	−2 21	Leith
Dartmouth	+0 33	Devonport
Deal & Downs	+0 3	Dover
Dieppe	+7 19	Brest
Donaghadee	+0 8	Kingstown
Donegal harbour	+0 17	Queenstown
Douglas & Ramsay	−0 11	Liverpool
Dublin bar	+0 2	Kingstown
Dundalk	−0 16	Kingstown
Dungeness	−0 27	Dover
Dunkerque	+0 56	Dover
Exmouth	+0 38	Devonport
Falmouth	−0 46	Devonport
Fecamp	+6 57	Brest
Ferrol	−0 47	Brest
Flamborough head	−1 59	Hull
Fleetwood	−0 12	Liverpool
Folkestone	−0 5	Dover
Fowey	−0 29	Devonport
Flushing	+1 42	Dover
Galway bay	−0 26	Queenstown
Gibraltar	−1 27	Brest
Glasgow (Port)	+0 10	Greenock
Gloucester	+2 51	Weston-s.-Mare
Granville	+2 26	Brest
Gravesend	−0 48	London
Grimsby (Great)	−0 53	Hull
Guernsey (St. Peter)	+2 50	Brest
Hartlepool	+0 5	N. Shields
Harwich	−1 52	London
Havre	+6 4	Brest
Helgoland	+0 21	Dover
[illegible]lyhead	−1 12	Liverpool
[illegible]y Island harbour	−0 53	N. Shields
[illegible]nfleur	+5 42	Brest
[illegible]erness	−1 59	Leith
Jersey (St. Helier)	+2 38	Brest
Kinsale	−0 18	Queenstown
Lerwick (Shetland)	−3 47	Leith
Limerick	+1 15	Queenstown
Lisbon bar	−1 17	Brest
Littlehampton	+0 24	Dover
Llanelly bar	−0 38	Weston-s.-Mare
Lowestoft	−4 1	London
Lynn & Boston Deep	−0 29	Hull
Margate	−2 18	London
Maryport	+0 3	Liverpool
Milford Haven entr.	−0 58	Weston-s.-Mare
Montrose	−0 52	Leith
Morlaix	+1 6	Brest
Needles point	−1 26	Dover
Newcastle	+0 23	N. Shields
Newhaven	+C 39	Dover
Newport	+0 16	Weston-s.-Mare
Nieuport	+1 6	Dover
Nore	−1 28	London
Orfordness	−2 43	London
Oporto	−1 17	Brest
Ostende	+1 13	Dover
Padstow	−1 41	Weston-s.-Mare
Peel, Isle of Man	−0 15	Liverpool
Pembroke Dock	−0 42	Weston-s.-Mare
Penzance	−1 13	Devonport
Peterhead	−1 43	Leith
Piel harbour, Barrow	−0 18	Liverpool
Plymouth breakwater	−0 6	Devonport
Poole	−2 2	Dover
Port Carlisle	+0 47	Liverpool
Portland breakwater	+1 18	Devonport
Port Patrick	−0 58	Greenock
Portsmouth	+0 29	Dover
Ramsgate	−2 19	London
Rotterdam	+4 33	Dover
Santander	−0 17	Brest
Scarborough	+0 48	N. Shields
Selsea bill	+0 38	Dover
Sheerness	−1 21	London
Shoreham	+0 22	Dover
Sligo bay	+0 17	Queenstown
Southampton	−0 42	Dover
Spurn point	−1 3	Hull
St. Ives	−2 10	Weston-s.-Mare
St. Malo	+2 18	Brest
St. Mary (Scilly)	−1 16	Devonport
St. Nazaire	−0 7	Brest
Stornoway	+6 38	Greenock
Stromness (Orkneys)	−5 17	Leith
Sunderland	−0 1	N. Shields
Swansea bay	−0 53	Weston-s.-Mare
Tay bar	−0 11	Leith
Tees bar	+0 22	N. Shields
Tenby	−1 12	Weston-s.-Mare
Thurso	−5 49	Leith
Torbay	+0 17	Devonport
Tralee bay	−0 58	Queenstown
Ushant (Ouessant)	−0 15	Brest
Valentia harbour	−1 19	Queenstown
Waterford	+0 19	Queenstown
Westport	−0 4	Queenstown
Wexford	+2 20	Queenstown
Whitby	+0 22	N. Shields
Whitehaven	−0 9	Liverpool
Wick	−2 55	Leith
Wicklow	−0 41	Kingstown
Workington	−0 19	Liverpool
Yarmouth road	−4 43	London
Youghall	+0 13	Queenstown

MARINE INVENTIONS.

Monthly List of Patents—Communicated by Messrs. W. P. Thompson & Co., British and International Patent and Trademark Agents and Consulting Engineers, 323, *High Holborn, London, W.C.;* 6, *Lord Street, Liverpool; and* 10, *Berridge Street, Leicester.*

ENGLISH (APPLICATIONS).

4280. Thomas Archer, jun., Dunston Engine Works, Dunston, Durham. "Improvements in the mode of and means employed for securing ships' cables, hawsers, or other hemp, steel, or metal ropes and chains bearing a pulling strain, more especially adapted for securing metal wire hawsers."

4298. Joseph Gibbons, Liverpool. "Improvements in and relating to propelling navigable vessels, and screw propellers therefor."

4373. John Nicholson Holliday, Sunderland, Durham. "Improvements in steering apparatus."

4377. Joseph Thomas Parlour, Fleet Street, London. "Improved means and apparatus for facilitating repairs of dock walls, ships, and other bodies; also for boring and carrying on other operations under water, such as lifting submerged bodies."

4383. Philip William Gowlett Nunn, Maplestead, Bournemouth. "Improvements in abdominal belts for the prevention or alleviation of sea sickness.

4384. Isaac Francis Dobson, Boston, Massachusetts, U.S.A. "Improvements in self-levelling tables, cattle pens, and other articles for use on shipboard." (A communication.)

4418. William Balch, Royal Navy, Greenwich. "Saving life at sea, and other purposes."

4455. Nicholas Stick, Hammersmith, Middlesex. "Improvements in the construction and propulsion of steam and other ships."

4463. William Renney, 54, Cawley Road, Victoria Park,

Middlesex. "Improved anti-fouling compositions for ships' bottoms and other submerged structures."

4482. Edgar George and Joseph Bond Morgan, both of Liverpool. "Improvements in or connected with cables for telephonic purposes."

4488. Charles Joseph Albert Ziegler, Paris, France. "Improvements in regulating the speed of marine engines, and in the apparatus or means to be employed therefor." (A communication.)

4521. Ralph Hart Tweddell, Delahay Street, Westminster. "Improved means and apparatus for rivetting ships and other plated structures."

4530. Alexander Poreckey, 3, Leconfield Road, Stoke Newington, Middlesex. "Improvements in steering ships, boats, and other vessels propelled by paddle-wheels."

4554. John William Shepherd, Tufnell Park Terrace, Holloway, and George Lines, of Cloudesley Road, Islington, both in Middlesex. "Improvements in ships' ventilators."

4565. Thomas Cornish, London. "Improvements in life rafts, boat protectors, and apparatus connected therewith."

4595. Daniel Henry Sisson, Goole. "Improved means or apparatus for raising and removing sunken or stranded vessels."

4629. William Horatio Harfield, Mansion House Buildings, London. "Improvements in ships' windlasses."

4630. Joseph Wright, Tipton, Stafford. "Improvements in anchors."

4650. Samuel Baxter, Hornsey Lane, Middlesex. "Improvements in the construction of anchors and of shackles for connecting together lengths of chains and wire cables used in connection with anchors, and for other purposes."

4689. Joseph Waters, Port Isaac, Cornwall. "Improvements in windlasses."

AMERICAN.

232435. John H. Barnes, Baltimore. "A harbour ballast for ships."

232487. Ambrose Griffin, Freeport, Mexico. "A steering apparatus for vessels."

232510. George W. Knapp, Baltimore, Md. "A sheet metal vessel."

232651. John W. Sadler, Glasgow, North Britain. "A construction of ships."

231781. Sir William Thomson, Glasgow. "A mariner's compass."

233931. Walter J. Brassington Watkins, New York. "An apparatus for trimming side-wheel steamboats."

233027. James Sample, Blyth, Great Britain. "An automatic disconnecting gear for ships' boats."

233080. Thomas G. F. Dolby, London, England. "A sheet metal vessel."

233086. Robert M. Fryer, San Francisco, California. "A buoyant propeller-ship."

233127. Joseph Trent, Greenville, New Jersey. "Means for propelling vessels."

233159. John B. Mooney, Cincinnati, Ohio. "A steamboat staging."

233209. Thomas J. Coultar, Wilton. "A vibrating propeller for boats."

Patents Published.

3650. September 12, 1879. Price 2d. (Not proceeded with.) William Ward, South Shields, Durham. "An improved composition for coating ships' bottoms, and for other purposes." This composition is composed of the following ingredients:—112 lbs. resin, 360 lbs. benzoline or other spirits, 112 lbs. zinc, 112 lbs. oxide of iron, 14 lbs. Indian red or other colouring matter, 60 lbs. Archangel tar, 10 lbs. arsenic, and 10 lbs. washing soda.

Sea Buoys.

1213. March 20th, 1880. Price 2d. (Not proceeded with.) James Sample, Blyth. The buoy is in the shape of a pier and is of steel, the bulb or larger end being divided into compartments decked over and utilised for the storage of fresh water. The upper end or stalk has a valve which remains open until struck by a heavy sea, when it closes automatically.

Hoisting or Lowering Boats, &c.

1073. March 12, 1880. Edward Bond, 323, High Holborn, London, W.C. Price 6d. "A grooved pulley receives a loose endless rope, for actuating the apparatus, and is held by eyes or guards. This pulley is connected by gearing with a wheel whose surface is formed to firmly hold the links of a chain passing over it and from which the boat is suspended. A spring block takes off sudden shocks."

Captain James Gordon's New Course Indicator and Error Detector for Steering Compasses.—Among the many recent contrivances for ascertaining the error of the compass and the course made good, one of the latest is that devised by Captain James Gordon. It is a combination of Captain Robertson's Deviation Detector (of 1856), with several ingenious devices and improvements of his own, and which he has found to answer exceedingly well in the s.s. *City of Mecca* on several voyages to Calcutta and back. Whether to set a given course, or to find the error of the compass, it is of easy application by the use of Burdwood's or Davis' Time Azimuth Tables, so that whenever any celestial body is visible, sun, moon, planet or fixed star, the direction in which the ship's head lies (or the true course) may always be known. The instrument is equally available for observation by a distant object. We are glad to see that the compass is receiving more attention than formerly; it has long been a much-abused, despised, and neglected instrument.

MONTHLY ABSTRACT OF NAUTICAL NOTICES.

No.	Place.	Subject.
411	English Channel—Approaches to Ushant	Soundings.
412	England — Thames Entrance — Swin Middle	Alteration of light.
413	" East Coast—Yarmouth and Lowestoft Districts	Alterations in buoyage.
414	Irish Sea—Isle of Man—South Coast—Langness Point	New light and proposed fog-signal.
415	North Sea—Maas River—Goeree Island—Scherm	Leading light altered in position.
416	" Hook of Holland Canal—Western Channel	Leading lights altered in position.
417	" Outer Eider Light-vessel	Left her station.
418	" Elbe River—Schelenkulen	New leading light.
419	Norway — South Coast — Skagerrak — Christiania Fiord—Horten	New harbour light.
420	Baltic Entrance —Kattegat—Sweden—Göteborg and Warberg	New lights and alterations.
421	" The Sound	Beacons; shoal ground, &c.
422	Baltic—Prussia—Pillau	New light on Mole.
423	" Gulf of Finland — Kronstadt—Sestroretzk	Harbour closed; light discontinued.
424	" Gulf of Bothnia — Abo — Kopmansgrund	New leading light
425	" " Finland — Storkalle grund	New light-vessel.
426	Africa—West Coast—St. Paul do Loando—Cape Lagosta	New light.
427	Mediterranean—Sardinia—San Pietro Island—Cape Sandalo	Light re-exhibited.
428	" Adriatic—Great Stagno Channel	New lights.
429	" " Gulf of Cattaro	New lights.
430	Black Sea — Kertch Strait — Yenikali Channel	Depth of water.
431	Red Sea—Suez Bay—Port Ibrahim	New lights and buoys.
432	Indian Ocean—Mozambique Channel—Barren Island	Shoal discovered.
433	China Sea—Philippine Island—Luzon—Lingayen Gulf	Avoid telegraph cable.
434	Russian Tartary — Port Vladivostok—Cape Goldoben	Alteration in fog-signal.
435	Australia—East Coast—Newcastle	Light on breakwater.
436	South Australia—Port Adelaide	Boat Channel blocked up.
437	North America — Vancouver Island — Strait of Georgia—Gabriola Reefs	Beacons and directions.
438	Pacific Coast—United States—California—Ano Nuevo Island	Change of fog-signal.
439	West Indies—Haïti — Port-au-Prince — Arcadins	Position of Lighthouse.
440	United States — Georgia — Savannah River—Fig Island	Change in beacons.
441	" North Carolina—Cape Hatteras and Cape Lookout	Automatic buoys withdrawn.
442	" Virginia — Thimble Shoal	Lighthouse burnt down.
443	" " Cape Henry	New siren fog-signal.

MONTHLY ABSTRACT OF NAUTICAL NOTICES—*continued.*

No.	PLACE.	SUBJECT.
444	UNITED STATES—Maryland—Blackistone Island	Fog-signal.
445	„ New Jersey—Raritan Bay—Great Beds	New light.
446	„ Massachusetts—Pollock Rip	Change of fog-signal.
447	CANADA—Bay of Fundy—St. John—Split Rock	Buoy and automatic whistle.
448	NEWFOUNDLAND—South Coast—Placantia	Shoal ground.
449	„ East Coast—St. John's —Merlin Rock	Increased depth of water.
450	GULF OF ST. LAWRENCE—Cape Breton Island—St. Esprit Island	New light.
451	„ „ Fame Point—	New light.

NAUTICAL NOTICES.

All Bearings Magnetic, unless otherwise stated.

411.—ENGLISH CHANNEL.—*Approaches to.—Soundings South-West of Ushant.*—Commander Methven, P. and O. Co.'s steamship *Kaisar-i-hind*, when recently entering the English channel from the south-westward, the ship being in lat. 48° 4½′ N., long. 6° 19′ W. (54 miles W. ½ S. [*mag.*] from Ushant), struck soundings in 60 fathoms, sand and shells. Proceeding on a N.E. ¼ E. (*mag.*) course, 2 and 5 miles respectively, depths of 63 and 69 fathoms were obtained; and, again, at a distance of 10¼ miles on that course, 68 fathoms, sand and shells. The attention of mariners is directed to the circumstance, that these depths lie some miles seaward of the 70 fathom line, as shown upon the charts to the south-westward of Ushant. *Variation*, 21° *W.*

412.—ENGLAND.—*Thames Entrance.—Swin Middle Light.*—With reference to Notice 287, p. 777, this light has been *altered* from a flash every minute to a *flash every half-minute.*

413.—ENGLAND.—*East Coast.—Yarmouth and Lowestoft Districts.—Alterations in Buoyage.*—With reference to Notice 290, p. 778, the following alterations have been made:—

(1.) INNER BARNARD BUOY has been moved 2½ cables S.W. by W. ½ W., and now lies in 3½ fathoms, with the life-boat house near Covehitheness, its width eastward of Sea Row cottage, N.N.E.; a

remarkable tree showing between Covehithe church tower and the ruin of the chancel, N.W. ¾ N.; the farm house on Eastonness, its width westward of Southwold west mill, S.W. by W.

(2.) SOUTH BARNARD BUOY has been moved 4 cables S.W. ¼ W., and now lies in 5 fathoms with Kessingland church, its length on Benacre sluice, N. ¼ W. Wly.; Covehithe church, its length southward of the Coastguard house and flagstaff on Covehitheness, W. by N. Nly.; Inner Barnard buoy, S.W. by W. ¾ W., distant one mile nearly.

(3.) A new 8-*feet can* buoy, painted red, and named SOUTH-EAST BARNARD BUOY, has been placed 5 cables N.E. ¼ E. from the former position of South Barnard buoy, and lies in 6 fathoms, with Kessingland church in line with the southern of three houses between Kessingland fish houses and Sea row, N.N.W. ½ W.; Covehithe church, open southward of Benacre wood, W. ½ S.; South Barnard buoy, S.W. ¼ W. Wly., distant 9 cables.

(4.) WEST NEWCOME BUOY has been moved one cable W.N.W., and now lies in 5 fathoms, with Pakefield mill touching the south side of Pakefield barn, N.N.W. ¾ W.; Pakefield lighthouse, between the second and third from the southward of six remarkable trees, W. ½ S.; S.W. Newcome buoy, S. by W. ¾ W., distant 7 cables.

(5.) SOUTH CORTON BUOY has been moved three-quarters of a cable east, and now lies in 5½ fathoms, with St. Nicholas church, just open eastward of Wellington pier head, Yarmouth, N. by W. Wly.; Corton church tower, its length southward of the northernmost houses at Corton, W. by N. ¾ N. Wly.; Kirkley church tower, its breadth westward of the gas house chimney, Lowestoft, S.W. by W. Wly.

(6.) SOUTH-WEST SCROBY BUOY has been moved 3 cables north, and now lies in 8½ fathoms, with St. Peter's church, just opening southward of the southernmost look-out at Yarmouth, W. by N. Nly.; St. Nicholas light-vessel, S.S.W. ¼ W., distant $1\frac{3}{10}$ths miles.

(7.) SCROBY ELBOW BUOY (BELL) has been moved 2½ cables N.N.E. ¾ E., and now lies in 6 fathoms with the southernmost mill at Yarmouth in line with the middle of Britannia pier head, S.W. ¾ W.; Caistor Elbow buoy N. ½ W., distant $1\frac{1}{10}$th mile; South Caistor buoy, N.W. by W. ¾ W., distant 7 cables.

(8.) West Scroby Buoy has been moved 2¼ cables N.N.E. ¾ E., and now lies in 6½ fathoms, with East Caistor church tower, its full length northward of Caistor look-out, N.W. by W. ½ W.; South Town highest mill, just open northward of St. Nicholas church, S.W. by W. ¾ W. Sly.; South Caistor buoy, W. ¾ S., distant 1 3/10ths mile.

(9.) Middle Scroby Buoy has been moved 2¼ cables northward, and now lies in 8 fathoms, with West Caistor church one-third from East Caistor church, towards a large house to the southward, near the Cliff, West Nly.; St. Peter's church, its length westward of the highest mill at Yarmouth, S.W.; North Caistor buoy, N.N.W. ¼ W. Wly., distant 1 2/10ths mile.

(10.) East Cross Sand Buoy has been moved 2½ cables S.E. by S., and now lies in 21 fathoms, with Winterton lighthouse, N.W. ¼ W.; St. Nicholas church, Yarmouth, W. ½ S.; Middle Cross sand buoy, S.S.W. ½ W., distant 2½ miles.

(11.) A new 13-*feet conical* buoy painted black, with staff and St. Andrew's Cross, named North-east Cross Sand Buoy, has been placed 6 cables S. by W. ½ W. from the former position of North Cross sand buoy, and lies in 17 fathoms, with Winterton lighthouse, N.W. by W. ¾ W. Nly.; St. Nicholas church, Yarmouth, W.S.W. Wly.; East Cross sand buoy, S. by W. ½ W. Wly., distant 2¼ miles.

(12.) North Cross Sand Buoy has been moved 1 7/10ths mile, N. by E. ¼ E., and now lies in 12 fathoms, with Winterton lighthouse, W. ¾ N.; Newarp light-vessel, N. by E. ¼ E. Ely., distant one mile; N.E. Cross sand buoy, S. by W. ¼ W. Wly., distant 2 3/10ths miles.

(13.) North Hasborough (Haisbro') Buoy has been moved 5 cables, N.W., and now lies in 8 fathoms with Hasborough light-vessel, W.S.W., distant 9 cables; North Middle Hasborough buoy, S. ¾ E., distant 2 3/10ths miles.

Note.—All depths given are at low water spring tides. *Variation*, 17¾° *W*.

414.—Irish Sea.—*Isle of Man.—South Coast.—Light on Langness Point.*—Exhibited on 1st day of December, 1880, from a lighthouse recently erected on Langness point. It will be a *flashing white* light, showing a *flash every five seconds:* elevated 76

feet above high water, and visible, where the coast line permits, from a distance of 14 miles; height of tower 63 feet.

Note.—A *fog-horn* is in course of construction at the lighthouse, and will be in operation at an early date, of which notice will be given.

415.—NORTH SEA.—*Maas River Entrance.—Goeree Island.—Scherm Leading Light.—Alteration in position.*—This light (north-westward of Goeree light) has been moved 142 yards to the west-ward, and on 1st October, 1880, the light would be exhibited from its new position, in lat. 51° 50′ N., long. 3° 56′ 45″ E.

Approaching—Scherm leading light in line with Goeree principal light bearing S.E. ⅞ S. leads about 80 yards westward of the chequered buoy (Ouddorp in t'backen); over Hinder bank in mid-channel between black buoy No. 1 and white buoy No. 2; and on opening Flauwe Werk light, the outer light-vessel will appear midway between black buoy No. 1 and white buoy No. 1 of the Bokke gat.

416.—NORTH SEA.—*Hook of Holland Canal.—Western Channel Leading Lights, Alterations in Position.*—The two red leading lights—**C** and **D**—previously situated near the Krimsloot, have been moved north-westward 1,312 yards, to the high ground north-ward of the Berghaventje, and would be exhibited therefrom, as leading lights for the western channel over the bar (Droogen), on 1st October, 1880. These lights now bear from each other S.E. by E. ⅝ E. and N.W. by W. ⅝ W. nearly, distant 273 yards. Position of outer light (C), lat. 51° 58′ 35″ N., long. 4° 7′ 30″ E.

Approaching—these lights in line bearing S.E. by E. ⅝ E. lead southward of the outer bar buoy (red) into the Westgat, and midway between the outer white buoy A and the outer black buoy A—continuing, the side of the channel marked by white buoys is neared till close to white buoy No. 4, and abreast of the south mole (Zuiddam) light—thence, the side marked by black buoys is kept until the white leading lights (**A** and **B**) on the south shore are obscured, indicating that the vessel is abreast the innermost black buoy No. 5—the red lights in line are then no longer available as a leading mark, and a channel course must be steered, till the white leading lights (**E** and **F**) on the north shore, are seen

and brought in line, serving as the leading mark in. *Variation*, 16½° *W*.

417.—North Sea.—*Outer Eider Light-Vessel.*—The Outer Eider light-vessel has left her station.

418.—North Sea.—*Elbe River.*—*Leading Light near Schelenkulen.*—In order to mark the stakes recently placed near the Bösch, a leading light was exhibited from a beacon on the sea wall near Schelenkulen. The light shows *red* down the river, *green* up the river, and the red light indicates the channel as far as the buoy (red) in lat. 53° 53′ 10″ N., long. 9° 14′ 10″ E. Position, lat. 53° 52′ 40″ N., long. 9° 16′ 5″ E.

419.—Norway.—*South Coast.*—*The Skagerrak.*—*Christiania Fiord.*—*Harbour Light at Horten.*—On the northern extremity of the mole arm at Horten, west side of Christiania fiord. It is a *fixed red* light, visible from the northward and from the eastward; it is intended for the use of steam vessels approaching Horten steamboat pier from the northward, and is shown from 2 a.m. till the steam vessels leave the pier. Position approximate, lat. 59° 25′ 0″ N., long. 10° 30′ 0″ E.

420.—Baltic Entrance.—*The Kattegat.*—*Sweden.*—(1.) *Göteborg* (*Gothenburg*).—*Leading Lights at Knippelholm and at Carnegieska, Discontinuance of Elfsborg Light.*—On 15th October, 1880, the following changes were made:—

Knippelholm.—In lieu of Elfsborg light, a *fixed* light is exhibited from the south-east angle of the keeper's dwelling (red) on the south-east part of Knippelholm, showing *white* within the channel, but *red* northward of the bearing S. 80° E., over Shalkorgarne and other shoals; it is elevated 25 feet above the sea. Position, lat. 57° 41′ 0″ N., long. 11° 49′ 20″ E.

Carnegieska.—Two *fixed red* lights, 58 yards apart, are exhibited from pillars (near the shore) in Carnegieska factory; the outer light is elevated 62 feet above the sea, the inner light 87 feet. Approaching Göteborg, the lights at Carnegieska must be kept in line.

Note.—Carnegieska factory is not marked on the Swedish charts. *Variation*, 12½° *W*.

(2.) *Warberg.*—*Alterations in Western Mole Light.*—The light

(fixed) now shows *red* over the harbour (through south) to the bearing of N. 65° E.; and *white* between the bearings of N. 65° E. and N. 41° E.; between the bearing of N. 41° E. and the shore it is obscured: the sector of white light visible from a distance of 4 miles, the red light is of much less power. Vessels approaching Warberg should keep in the sector of white light, in order to avoid Ryggen and Masten shoals on the one hand, and Skälklippan (Sätklippan) rock on the other hand—when abreast Warberg fortress, steer more to the northward and enter the red light.

Note.—Masten shoal is not named in the latest Swedish charts, nor mentioned in the Swedish sailing directions. *Variation*, 12¼° *W.*

421.—Baltic Entrance.—*The Sound.*—(1.) *Hoganœs.—Pole Beacons on Hamneboe Shoal.*—Two wooden pole beacons on the northern edge of Hamneboe (Hamnebaden) shoal, approach to Hoganœs. The eastern pole surmounted by one black ball, the western by two black balls.

(2.) *Oere Sound.—Shoal N.N.W. of Grolle Ground.*—Owing to the existence of a shoal with 16 feet over it, lying in Oere sound, about one-third of a mile N.N.W. of Grolle ground, the floating beacon marking Grolle ground has been moved N.W. by N., half-a mile, to the north-west edge of the recently found shoal. *Variation*, 11½° *W.*

(3.) *Copenhagen.—Light Marking Torpedo Ground discontinued.*—With reference to Notice 336, p. 861, the beacon light to indicate the locality where torpedo experiments were being made, between Provestenen and Mellem forts, near Copenhagen, is now discontinued.

422.—Baltic.—*Prussia.—Pillau.—Light on North Mole.*—On 1st November, 1880; it is a *fixed red* light, elevated 37 feet above the sea, visible seaward between the bearings of S.W. by S. and North; seen from a distance of from 7 to 8 miles. The lighthouse, 28 feet high, constructed of iron, circular in shape, and painted red, is situated N. 45° ¼ W., distant 2,132 yards from Pillau principal lighthouse. *Variation*, 7½° *W.*

423.—Baltic.—*Gulf of Finland.—Kronstadt.—North Channel.—Sestroretzk Harbour.—Lights Discontinued.*—The harbour lights at Sestroretzk (Zestroretzki) northward of cape Dubowsk, have

been discontinued, and the harbour itself will no longer be maintained.

424.—Baltic.—*Gulf of Bothnia.—Abo.—Leading Light on Köpmansgrund Islet.*—Exhibited from the south-west side of the keeper's dwelling (constructed of wood) on Köpmansgrund islet, southern approach to Abo. It is a *fixed red* light, visible between the bearings of S. 40° E. (through north) and N. 47° W.; elevated 8 feet above the ground, 26 feet above the sea, and visible in clear weather from a distance of 6 miles. Position, lat. 60° 24′ 20″ N., long. 22° 7′ 30″ E. This light is intended to guide vessels approaching Abo from Ersta fiord. The beacon previously on the islet has been removed. *Variation*, 6° *W.*

425.—Baltic.—*Gulf of Bothnia.—Finland.—Light-Vessel Westward of Storkalle Grund.*—On 30th July, 1880, a light-vessel (fitted with a steam-engine) was stationed about 2 miles westward of the central shoal (Ruskenskallan) of Storkalle grund, west coast of Finland. The light (shown from the foremast) is *fixed white*, elevated 31 feet above the sea, and visible from a distance of 11 miles. The light-vessel, painted black, with the words *Storkalle grund* on her sides, has two masts, and is moored in 11 fathoms water. During the day, a red ball is carried at the foremast head; light-vessel's flag (yellow with blue cross) at the mizen; and the Russian commercial ensign at the taffrail. Position, lat. 62° 47′ 30″ N., long. 20° 45′ 0″ E.

Note.—Vessels must pass westward of this lightship; she is placed in position on the opening of navigation, and only leaves it when ice or other circumstances necessitate her withdrawal. During thick and foggy weather, a steam *fog-whistle* is sounded for *forty-five seconds* every *three minutes.* *Variation*, 16¾° *W.*

426.—Africa.—*West Coast.—St. Paul de Loando Harbour.—Light on Cape Lagosta.*—With reference to Notice 392, p. 957, this light is now established.

427.—Mediterranean.—*Sardinia.—South-West Coast.—San Pietro Island.—Cape Sandalo.—Light Re-exhibited.*—With reference to Notice 228, p. 609, the permanent light is now re-exhibited. It is a *fixed white* light with *flashes every minute.*

428.—Mediterranean.—*Adriatic.—East Coast.*—(1.) *Great*

Stagno Channel.—Light on Brozze Mole.—In October, 1880, a *fixed red* light would be exhibited from an iron standard on Brozze mole. Position approximate on chart, lat. 42° 49′ 20″ N., long. 17° 43′ 0″ E.

(2.) *Light on Stagno Mole.*—In October, 1880, a *fixed red* light would be exhibited from an iron standard on Stagno mole. Position, lat. 42° 50′ 10″ N., long. 17° 42′ 0″ E.

429.—MEDITERRANEAN.—*Adriatic.—Gulf of Cattaro Entrance.*—(1.) *Light on Fort Mamula.*—In October, 1880, a *fixed red* light would be exhibited from an iron standard on Fort Mamula, Rondoni rock, east side of entrance to the gulf of Cattaro. Position, lat. 42° 23′ 45″ N., long. 18° 33′ 45″ E.

(2.) *Cattaro.—Particulars of Harbour Light.*—It shows *red* between the bearings of W. by S. ¾ S. (through south) and E. by N. ¾ N.—*white* in all other directions. *Variation,* 8¼° *W.*

430.—BLACK SEA.—*Kertch Strait.—Depth in Yenikali Channel.*—With reference to Notice 387, p. 956, that on first October, 1880, the deep channel of Yenikali would be open to vessels of 18 feet draught.

431.—RED SEA.—*Gulf of Suez.—Suez Bay.—Lights at Port Ibrahim.*—With reference to Notice 309, p. 783, respecting the establishment of lights and buoys at the entrance to Port Ibrahim, the following arrangements are now in force :—

(1.) Two floating light buoys, painted black, are placed 897 yards seaward of the entrance of the harbour, from which lights are exhibited *on application to the Port office*—*red* on the northern side of the channel, *green* on the southern side.

(2.) A *fixed red* light is shown from the extremity of the north mole head; a *fixed green* light from the extremity of the south mole head.

(3.) A *fixed white* light is shown from the extreme (western) end of the inner pier of the harbour.

Note.—These green and red lights mark the channel into the port.

Entering port Ibrahim—the *red* lights are left on the port hand, the *green* lights on the starboard hand, the vessel being steered for the white light on the inner pier.

Buoyage.—Two buoys have been placed, one on each side of the channel to port Ibrahim, 568 yards from the mole heads—one in line with the green lights, the other in line with the red lights.

432.—Indian Ocean.—*Mozambique Channel.*—*Shoal South-West of Barren Islands.*—Reported on the authority of D. Francisco Vines, captain of the corvette *Rosa del Juria*, a detached shoal lying south-west of Barren islands, west coast of Madagascar, nearly 50 miles distant from that group. This danger (*Bajo de Vines*) was sighted from the *Rosa del Juria* at 10 a.m. on 22nd December, 1871, bearing to the west-south-west distant about 1½ miles—the vessel being then in 41 fathoms over sand and shells—on nearing it to the distance of about half a mile the depth of 3¾ fathoms over coarse sand was obtained. Captain Vines then landed on the bank, and describes it as being composed of sand, almost circular, about 14 yards in diameter, and to dry about 2 feet at low water, with 1¾ fathoms at the distance of half a cable around. Position as given, lat. 18° 51′ 30″ S., long. 43° 1′ 25″ E.

433.—China Sea.—*Philippine Islands.*—*Luzon.*—*West Coast.*—*Telegraph Cable in Port Bolinao, Lingayen Gulf.*—The telegraph cable is laid between Luzon and the adjacent coast of China. The terminus of the cable in port Bolinao is near a small building close to the west shore; it is thence laid in a N. 63½° E. direction nearly 2 cables to a buoy (painted red) moored in 10 fathoms water, thence to seaward in a N. 16½° W. direction. Mariners are cautioned not to anchor northward of this buoy, when it bears between S.E. and S. ¼ W.—nor westward or southward of the buoy, when it bears between East and N.E. ¼ N. *Variation*, ½° E.

434.—Russian Tartary.—*Peter the Great Bay.*—*Port Vladivostok.*—*Cape Goldobin.*—*Alteration in Fog-Signal.*—With reference to Notice 350, p. 865, in lieu of one bell, the fog-signal now consists of one large bell and one small bell. During thick or foggy weather the large bell will be sounded in slow succession, but in answer to signals from seaward, both bells will be sounded in quick succession.

435.—AUSTRALIA.—*East Coast.—Newcastle Harbour.—Light on Breakwater.*—The breakwater on the south side of Newcastle harbour entrance now extends about 430 yards in a north-easterly direction from Nobby head, and that on the 2nd August, 1880, a light was exhibited about 70 yards from its extremity. It is a *fixed red* light, elevated 30 feet above high water, visible seaward between the bearings of N.W. by W. and E. by N.

Note.—The light on a N.W. by W. bearing leads clear of Big Ben rock; and bearing E. by N. clears the shoal ground extending off Nobby head north-westward of the breakwater.

Fog-bell.—During thick and foggy weather, a powerful *fog-bell* will be sounded from the breakwater. *Variation*, 10½° *E.*

436.—SOUTH AUSTRALIA.—*Gulf of St. Vincent.—Boat Channel, Port Adelaide.*—Is now blocked up.

437.—NORTH AMERICA.—*West Coast.—Vancouver Island.—Strait of Georgia.—Gabriola Reefs.*—The beacon erected on Gabriola reefs, near the eastern end of Gabriola island, stands on the largest ledge which covers at 6 feet rise of tide. At the distance of nearly 6 cables N. 15° E. from this beacon—and about 2 cables' lengths seaward from the end of the Gabriola reefs, a detached rock which dries 1½ feet at low water spring tides, has been found in the kelp which marks the neighbourhood. There is 11 fathoms within a cable's length of the rock on its seaward side, and between it and the Gabriola reefs, there appeared to be a depth of about 5 fathoms over a rocky bottom. Berry point bearing W. ½ S. (well open of Flat Top point), leads about one mile northward of Gabriola reefs and the above-named detached rock. The entrance points of Portier pass just touching on a S.S.E. ¼ E. bearing lead eastward of the reefs. *Variation*, 23¼° *E.*

438.—PACIFIC COAST.—*United States.—California.—Change of Characteristic of Fog-Signal at Ano Nuevo Island.*—On and after January 1, 1881, this fog-signal will be changed to a blast of 10 seconds' duration, followed by intervals of 55 seconds, thus—blast, 10 seconds; interval, 55 seconds; blast, 10 seconds; interval, 55 seconds.

439.—WEST INDIES.—*Haïti.—Port-au-Prince.—Position of Arcadins Lighthouse.*—This lighthouse, north shore Port-au-Prince,

is situated on the north-west extreme of the centre Arcadins islet.

440.—UNITED STATES.—*Georgia.—Fig Island Ranges, Savannah River.—Change of Fig Island Beacon.*—On and after December 1, 1880, the beacon-light now on the eastern end of Fig island, Savannah river, will be removed to a structure erected in the water on the south side of that island, and a light will be displayed from the tower of the Exchange Building, in the city of Savannah, which, with the Fig island light, will form a range for guiding through the "Wrecks" channel in the Savannah river. Both lights will be *fixed red.* The front one will be shown at a height of 30 feet above mean low water, from a square white lantern-room standing on a pile foundation in 5 feet of water at low tide. The rear one will be 130 feet above mean low water. They will be visible immediately after rounding Elba island point, and will come into range about three-quarters of a mile above Fort Jackson. Approximate position of *front light*, lat. 32° 4′ 48″ N., long. 81° 3′ 56″ W. From the front beacon Fort Jackson bears E. ½ N., distant 1½ miles.

441.—UNITED STATES.—*North Carolina.—Automatic Buoys off Capes Hatteras and Lookout.*—Both *withdrawn*, it having been found impossible to keep them in position.

442.—UNITED STATES.—*Virginia.—Thimble Shoal Lighthouse.* —This lighthouse on the north side of channel, entrance to Hampton Roads, has been completely *destroyed by fire.* Until its re-establishment, due notice of which will be given, a temporary light will be displayed from the site.

443.—UNITED STATES.—*Virginia.—Fog-Signal at Cape Henry Light-Station.*—A first-class steam-siren will be sounded during thick and foggy weather from Cape Henry Light-station, giving blasts of 5 seconds' duration, followed by intervals of 90 seconds, thus—blast, 5 seconds; interval, 90 seconds; blast, 5 seconds; interval, 90 seconds.

444.—UNITED STATES.—*Maryland.—Fog-Bell at Blackistone Island Light-Station.*—There will be sounded during thick and foggy weather, at Blackistone island light-station, Potomac river, a fog-bell, struck by machinery at intervals of 16 seconds;

the bell is on the south-west corner of the roof of the lighthouse.

445.—United States.—*New Jersey.—Light at Great Beds, Raritan Bay.*—On and after November 15, 1880, there will be exhibited from the new lighthouse recently erected at Great Beds, Raritan bay, a *fixed red* light illuminating the entire horizon; elevated 57 feet above mean low water; and visible about 13 miles. The lighthouse is an iron tower of five sections, standing on an iron pier filled with concrete. The pier and tower are red; the lantern, black. Approximate position, lat. 40° 29′ 10″ N., long. 74° 15′ 22″ W.

446.—United States.—*Massachusetts.—Change of Characteristic of Fog-Signal on Pollock Rip Light-Ship.*—Now changed to a blast of 5 seconds' duration, followed by intervals of 55 seconds, thus—blast, 5 seconds; interval, 55 seconds; blast, 5 seconds; interval, 55 seconds.

447.—Canada.—*Bay of Fundy.—St. John.—Buoy with Automatic Whistle off Split Rock.*—On 13th September, 1880, a buoy fitted with an automatic (or self-acting) 10-inch whistle was moored in 34 fathoms water with Split rock—approach to St. John harbour—bearing N. ¼ E., distant 2 miles. Position, lat. 45° 6′ 30″ N., long. 66° 12′ 30″ W.

448. — Newfoundland. — *South Coast. — Placentia. — Shoal Ground at Entrance of Placentia Road.*—According to observations by Captain Robert Halpin, of the Telegraph cable steamship *Seine*, shoal ground with a general depth over it of 3¾ fathoms, extends in an easterly direction nearly 2 cables from the small 5 fathoms bank, shown on the plan of Placentia road, as lying W. by N. ¼ N., distant 5½ cables from Privécœur point. *Variation*, 30° *W.*

449. — Newfoundland. — *East Coast. — St. John's Harbour Entrance.—Depth on Merlin Rock.*—The depth has been increased (by blasting) to 29 feet.

450.—Gulf of St. Lawrence.—*Cape Breton Island.—Light on St. Esprit Island.*—On 1st November, 1880, a light would be exhibited from a lighthouse recently erected near the East extreme of St. Esprit Island, south coast of Cape Breton island. It is a *revolving* light, attaining its greatest brilliancy *every thirty seconds*,

elevated 78 feet above high water, and visible from a distance of 14 miles. The lighthouse, 55 feet high and constructed of wood, consists of a square tower, painted white with two red bands—keeper's dwelling attached. Position, lat. 45° 37′ 30″ N., long. 60° 29′ 20″ W.

Note.—The dangerous shoal—Bad Neighbour—lying S.W. ¾ W. 1½ miles from St. Esprit lighthouse, has not more than 12 feet on it at low water. *Variation*, 24¾° *W*.

451.—Gulf of St. Lawrence.—*Light on Fame Point.*—On 1st October, 1880, a light would be exhibited from a lighthouse recently erected on Fame point, south shore of the gulf of St. Lawrence. It is a *fixed white* light varied by *red flashes* every *twenty seconds*, elevated 200 feet above high water, and visible from a distance of 20 miles. The lighthouse, 50 feet high, is square, constructed of wood, with dwelling attached, painted white. Position, lat. 49° 6′ 50″ N., long. 64° 36′ 20″ W.

Hydrographic Notices recently Published by the Hydrographic Office, Admiralty, 1880.

No. 28.—Mediterranean Sea. Archipelago:—Cancels No. 18 of 1879.

No. 29.—Newfoundland Pilot, notice 4. Information relating to Virgin rocks, Eastern shoals, and portions of Newfoundland.

No. 30.—Channel Pilot, part II., notice 2. Information relating to port St. Malo.

No. 31.—West India Pilot, vol. II., notice 10. Jamaica:—sailing directions for the north coast, between Falmouth and Morant point.

OUR OFFICIAL LOG.

Official Inquiries at Home, 1880.

741. *Xanthus*, s.s.; built at Peterhead, 1846; owned by Mr. John Duthie; tonnage, 172; Peterhead to Cumberland Sound; on a fishing cruise; abandoned in Melville Bay, June 29, 1880, and afterwards destroyed by fire. Inquiry held at Aberdeen, September 27, 1880, before Cook and Donald, Justices; C. Y. Ward and G. W. Ward, N.A. Abandonment unjustifiable; master and mate responsible for burning and destruction of vessel. Master's certificate cancelled; mate's suspended for twelve months.

743. *Frankfort*, s.s.; built at Port Glasgow, 1851; owned by Mr. R. C. Macnaughton, Liverpool; tonnage, 691; Liverpool to Stockholm; general cargo; lost near Skerryvore lighthouse, September 4, 1880. Inquiry held at Liverpool, October 15, 1880, before Raffles, Stip. Mag.; Wilson and French, N.A. Casualty due to master under-estimating the distance run from Rathlin Island; acquitted of any wrongful act or default.

747. *Banner*, ship; built in Quebec, 1863; owned by Mr. C. S. Caird and others, of Greenock; tonnage, 1,194; Rio de Janeiro to Pensacola; ballast; lost on Pedro Bank, Jamaica, August 1, 1880. Inquiry held at Liverpool, October 19, 1880, before Raffles, Stip. Mag.; Ward and Cowie, N.A. Casualty caused by negligent navigation of both master and mate. Master's certificate suspended for three months and mate's for six.

753. *Aurora*, s.s.; built at Cork, 1856; owned by Palgrave and Murphy, Dublin; tonnage, 377; Oporto to Southampton; ballast and 250 head of cattle; foundered at sea, September 15, 1880, when fifteen lives were lost. Inquiry held at Westminster, October 7, 1880, before Rothery, Wreck Commissioner; Grant, Parfitt, and Harland, N.A. Accident due to the vessel having been kept on her course too long with the wind and sea a-beam instead of her being put head to wind as soon as the gale commenced. Court recommended that stronger head ropes should be used in cattle ships than appeared to be the custom.

755. *Paul Boyton*, ship; built at Plymouth, Nova Scotia, 1875; owned by Mr. A. Lovit and others; tonnage, 1,097;

Baltimore to Hamburgh; grain; lost on the Goodwin Sands, September 19, 1880. Inquiry held at Westminster, October 8, 1880, before Rothery, Wreck Commissioner; Hight and Curling, N.A. Loss due to the master steering improper courses when approaching the sands. Certificate suspended for six months, and recommended for one as mate during that time.

757. *Apollo*, s.s.; built at Barrow-in-Furness, 1874; owned by Sir James Ramsden and others; tonnage, 307; Glasgow to Barrow; general cargo; stranded on Holy Island, Arran, September 26, 1880. Inquiry held at Glasgow, October 22, 1880, before Brown and Hamilton, Justices; Ward and Parfitt, N.A. Mate to blame for not calling the master when the weather became thick; his master's certificate suspended for three months.

758. *Canopus*, s.s.; built at Hull, 1870; owned by the Moss Steamship Company (Limited); tonnage, 1818; coals and passengers; stranded on Keil Point, Mull of Cantyre, September 26, 1880. Inquiry held at Liverpool, October 27, 1880, before Raffles, Stip. Mag.; Ward and Cowie, N.A. Accident due to the vessel being considerably to the eastward of her proper position as estimated by the master. Court did not, however, deal with his certificate.

760. *Asia*, s.s.; built at Sunderland, 1858; owned by Mr. G. C. Stewart and others; tonnage, 902; Glasgow to Leghorn; coals; destroyed by fire at Bona, Algeria, August 20, 1880. Inquiry held at Liverpool, October 29, 1880, before Raffles, Stip. Mag.; Ward and Cowie, N.A. Master acquitted of any wrongful act or default.

Official Inquiries Abroad.

735. *Mary Anning*, schooner; foundered off the coast of Yucatan, August 10, 1880. Inquiry held at Belize, August 23, 1880. Master free from blame.

736. *Royal Standard*, s.s.; stranded on St. Stefano Point. Inquiry held at Constantinople, September 18, 1880. Court held that the master, when approaching land in thick weather, should have used the lead. Severely reprimanded.

742. *Rodondo*, s.s.; stranded on Williamstown Back Beach,

August 6, 1880. Inquiry held by Victoria Steam Navigation Board, August 9, 1880. Master exonerated.

744. *Undecimus*, barque; destroyed by fire at Tripoli, September 9, 1880. Inquiry held at Malta, October 8, 1880. No blame attached to master or officers.

745. *Star of Africa*, barque; lost on Albatross Rock, Oliphant's Bosch, August 29, 1880. Inquiry held at Simon's Town, September 24, 1880. Master in default for keeping too close in shore.

746. *Erin's Star*, ship; lost on Point Reyes, California. Naval Court held at San Francisco, September 22, 1880. Master in default for not using the lead. Certificate suspended for three months.

748. *Waverley*, brig; stranded at the River Don, July 9, 1880. Inquiry held at Torquay, New Zealand, August 4, 1880. Casualty due to master omitting to obtain a pilot. Certificate suspended for three months.

749. *Kennedy*, s.s.; stranded on North Beach, River Grey, New Zealand. Inquiry held at Greymouth, July 24, 1880. Accident caused by the signalman at the semaphore giving an improper signal.

750. *Julius Vogel*, schooner; stranded on the South Spit, Waitara Taranaki, July 31, 1880. Inquiry held at New Plymouth, August 13, 1880. Master acquitted of blame.

751. *Malay*, barque; stranded on Barrett's Reef, Port Nicholson, Wellington, July 25, 1880. Accident caused by a sudden change of wind. Master somewhat to blame for placing vessel in a critical position.

752. *Aline*, barque; lost near Maldonado, Uruguay, September 13, 1880. Naval Court held at Monte Video, September 23, 1880. Accident due to the vessel being navigated with an obsolete chart.

754. *Duke of Lancaster*, s.s.; lost on Jebel Zooghur Island, Red Sea, July 13, 1880. Inquiry held at Aden, July 23, 1880. Master might have exhibited greater cautiousness whilst navigating in close proximity to the land. Court submit that lighthouse should be placed on Abu Aid island.

756. *Citizen of London*, schooner; stranded at Port Bunbury, August 20, 1880. Inquiry held at Bunbury, Western Australia, September 3, 1880. Master guilty of error of judgment.

GENERAL.

THE AMERICAN MERCANTILE MARINE.—The decline in the shipping trade of the United States still goes on. The latest returns indicate that steam shipbuilding continues to fall off, and that the carrying trade to and from American ports is chiefly performed by the shipping of other countries. It is not that commerce itself declines, for the returns show that the ocean tonnage entered and cleared at the ports of the United States is certainly increasing. The following figures further show how large a proportion of tonnage has been irretrievably lost, and the sale of 26,882 tons to foreigners by a nation whose Mercantile Marine is not too large, and who express themselves as most anxious to develope their shipping trade, is somewhat ominous, and seems to point to causes of decline which it must be difficult to fight against.

STATEMENT OF VESSELS SOLD TO FOREIGNERS, LOST, AND ABANDONED DURING THE YEAR ENDED JUNE 30, 1880.

	Ships	Barks	Brigs	Schooners	Sloops	Steamers	Canal Boats	Barges	Total No.	Total tonnage
Sold to foreigners...	14	9	3	42	5	8	—	5	86	26,882·81
Lost at sea	20	34	19	296	36	43	1	20	469	98,439·58
Abandoned............	4	5	6	129	67	106	5	38	360	40,390·25
Totals............	38	48	28	467	108	157	6	63	915	165,712·64

INDEX TO VOL. XLIX.

BOOKS, NOTICES OF.

OFFICIAL INQUIRIES AT HOME AND ABROAD.

NAUTICAL NOTICES CONCERNING LIGHTS, BUOYS, FOG-SIGNALS, ROCKS, SHOALS, &c.

HYDROGRAPHIC NOTICES.

PUBLISHED BY THE ADMIRALTY.

CHARTS, &c., PUBLISHED BY THE ADMIRALTY.

BOOKS, NOTICES OF.

OFFICIAL INQUIRIES AT HOME AND ABROAD.

NAUTICAL NOTICES CONCERNING LIGHTS, BUOYS, FOG-SIGNALS, ROCKS, SHOALS, &c.

HYDROGRAPHIC NOTICES.

PUBLISHED BY THE ADMIRALTY.

CHARTS, &c., PUBLISHED BY THE ADMIRALTY.

HYDROGRAPHIC NOTICES.

PUBLISHED BY THE ADMIRALTY.

CHARTS, &c., PUBLISHED BY THE ADMIRALTY.